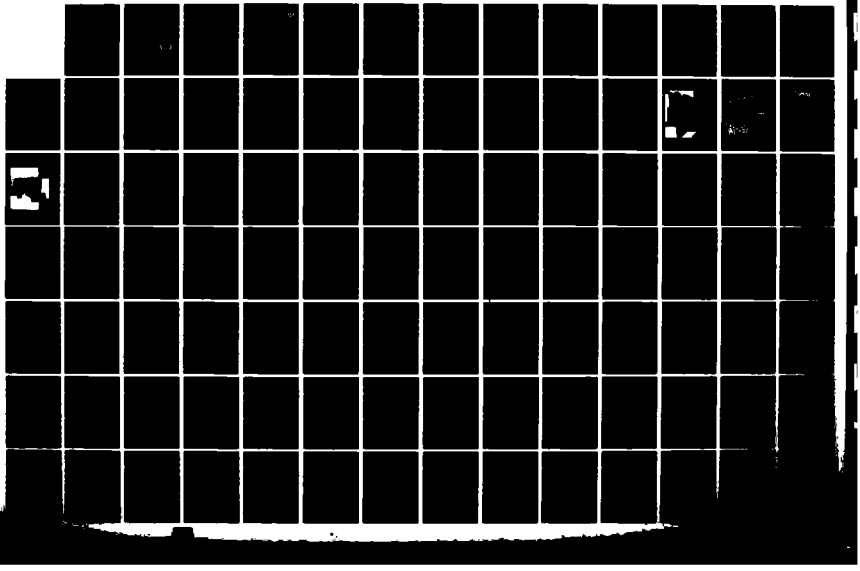
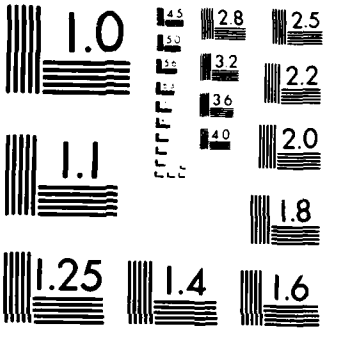
AD-A149 918 DEPLOYMENT AREA SELECTION AND LAND WITHDRAWAL/ACQUISITION M-X/MPS (M-X/MU.. (U) HENNINGSON DURHAM AND RICHARDSON SANTA BARBARA CA 02 OCT 81 1/3

UNCLASSIFIED M-X-ETR-27 F/G 16/1 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963 A

(1)

M-X/MPS

ENVIRONMENTAL

TECHNICAL REPORT

PRELIMINARY FEIS

REVIEW COPY 2 OCTOBER 1981

ETR 27

ECONOMIC MODEL

DEPLOYMENT AREA SELECTION AND LAND WITHDRAWAL/ ACQUISITION

DEPARTMENT OF THE AIR FORCE

M-X ETR-27

ECONOMIC MODEL

Prepared for

United States Air Force
Ballistic Missile Office
Norton Air Force Base, California

By

Henningson, Durham & Richardson, Inc.
Santa Barbara, California

REVIEW COPY OF WORK IN PROGRESS

2 October 1981

DEPARTMENT OF THE AIR FORCE
WASHINGTON 20330

OFFICE OF THE ASSISTANT SECRETARY

Federal, State and Local Agencies

On October 2, 1981, the President announced his decision to complete production of the M-X missile, but cancelled the M-X Multiple Protective Shelter (MPS) basing system. The Air Force was, at the time of these decisions, working to prepare a Final Environmental Impact Statement (FEIS) for the MPS site selection process. These efforts have been terminated and the Air Force no longer intends to file a FEIS for the MPS system. However, the attached preliminary FEIS captures the environmental data and analysis in the document that was nearing completion when the President decided to deploy the system in a different manner.

The preliminary FEIS and associated technical reports represent an intensive effort at resource planning and development that may be of significant value to state and local agencies involved in future planning efforts in the study area. Therefore, in response to requests for environmental technical data from the Congress, federal agencies and the states involved, we have published limited copies of the document for their use. Other interested parties may obtain copies by contacting:

National Technical Information Service
United States Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161
Telephone: (703) 487-4650

Sincerely,

JAMES F. BOATRIGHT
Deputy Assistant Secretary
of the Air Force (Installations)

1 Attachment
Preliminary FEIS

PREFACE

This report was prepared as part of the environmental analysis process for the M-X Missile program. It documents the data, assumptions, and methods used in estimating the critical economic and demographic impacts of deploying the M-X missile in Nevada/Utah, Texas/New Mexico, or both. The impact estimates themselves are reported and discussed in Chapter 4 of the Deployment Area Selection and Land Withdrawal Acquisition Environmental Impact Statement. More detailed impact estimates are reported in other Environmental Technical Reports in this series (see ETRs 2A-2L, 3A-3C, and 44).

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ECONOMIC MODEL:
REGIONAL INTERINDUSTRY ANALYSIS OF THE ECONOMIC IMPACTS OF THE M-X SYSTEM

1.0 INTRODUCTION

This report documents the methods, assumptions, and data used to estimate the regional economic impacts of M-X deployment. The central component of this analysis is a system of county-level interindustry models drawing on a modified version of the Regional Industrial Multiplier System (RIMS). These models, combined with estimates of the final demand changes associated with M-X deployment, permit projection of the project's direct and indirect economic effects. A description of RIMS is provided as Appendix D to this report.

The direct economic effects of the M-X project originate at specific geographic locations. Construction camps represent points of employment and earnings for construction and assembly and checkout personnel. The locations of operating bases likewise constitute sites of employment and earnings for construction, assembly and checkout, and operations personnel, and are assumed to be the points of origin for local commodity and service procurement.

Significant consequences of direct project-related economic activities are, however, distributed over a broad region. This analysis makes specific assumptions about the regional distribution of project-related expenditures that originate at points of project activity. These expenditures constitute changes in final demand for county-level interindustry models which then estimate direct and indirect earnings, employment, labor force, and population effects in each ROI county.

The county-level models are designed to use exogenous baseline projections of county population, labor force, employment, and unemployment. Project-related employment, earnings, labor force, and population changes are added to the exogenous baseline to estimate the annual values of these variables in each county with the project.

The modeling system uses one year as the basic time unit of analysis, and performs the following tasks:

(1) calculating direct project employment, earnings, procurement, and related investment effects on the economy of the deployment region;

(2) estimating the probable distribution of project-related demands across the counties within the region;

(3) deriving indirect gross output (sales) changes for the economy of each county based on the demands of the project and the RIMS multipliers estimated for that county;

(4) tracing changes in gross output through changes in earnings and employment indirectly related to the project;

(5) calculating total M-X-related employment (direct plus indirect) by county of residence and comparing it to the labor force in each county projected to be available for employment under no-project conditions;

(6) estimating net labor force migration into each county in the region based on the excess of project-related employment over the locally available supply of labor;

(7) projecting M-X-related increases in population from the amount of labor force in-migration; and

(8) determining the probable distribution of population changes among communities, construction camps, and operating bases.

The analysis considers all the alternatives included in the M-X Deployment Area Selection and Land Withdrawal/Acquisition Environmental Impact Statement. It also considers both the Nevada/Utah and Texas/New Mexico deployment regions.

Figures 1-1 through 1-3 present a diagrammatic overview of the M-X socioeconomic impact modeling system used in this analysis. The specific components of the general framework summarized in these figures are documented in this report.

Figure 1-1 describes the labor demand component of the system. The analysis begins with the M-X project description. The key elements of this project description are employment, procurement, and related investment, though descriptions of other plans and activities also affect the impact projections. All of these characteristics are specific to times and places within the deployment regions.

The estimation of direct effects is a critical component of the analysis. The direct effects consist of the location of employment by county and the regional distribution of various categories of project-related final demands. Project-related expenditures fall into four major categories: consumption expenditures originating from camp payrolls; consumption expenditures originating from base payrolls; base procurement expenditures (which include ongoing military construction procurement); and related investments in community infrastructure. Regional allocation assumptions are combined with assumptions about wages, taxes, savings, and income transfers to estimate the regional distribution of these expenditures.

Section 2 documents the data and assumptions used to estimate the magnitude and regional distribution of the direct economic effects of M-X deployment. Estimation of payroll-related consumption expenditures requires a specification of the project's direct demand for labor, so section 2.1 discusses the direct personnel requirements of M-X. The direct employment data used in this analysis are presented in Appendix A of this report and Chapter 4 of the EIS. The demand for labor would be distributed over a wide geographic area. Procurement of other construction resources and goods and services for base operations will also affect certain geographic areas. Section 2.2 defines the regions of influence (ROIs) for this analysis--those areas where most income and employment effects of M-X deployment would occur.

The balance of Section 2 presents the data, assumptions, and procedures used to estimate local consumption final demands of direct employees, procurement

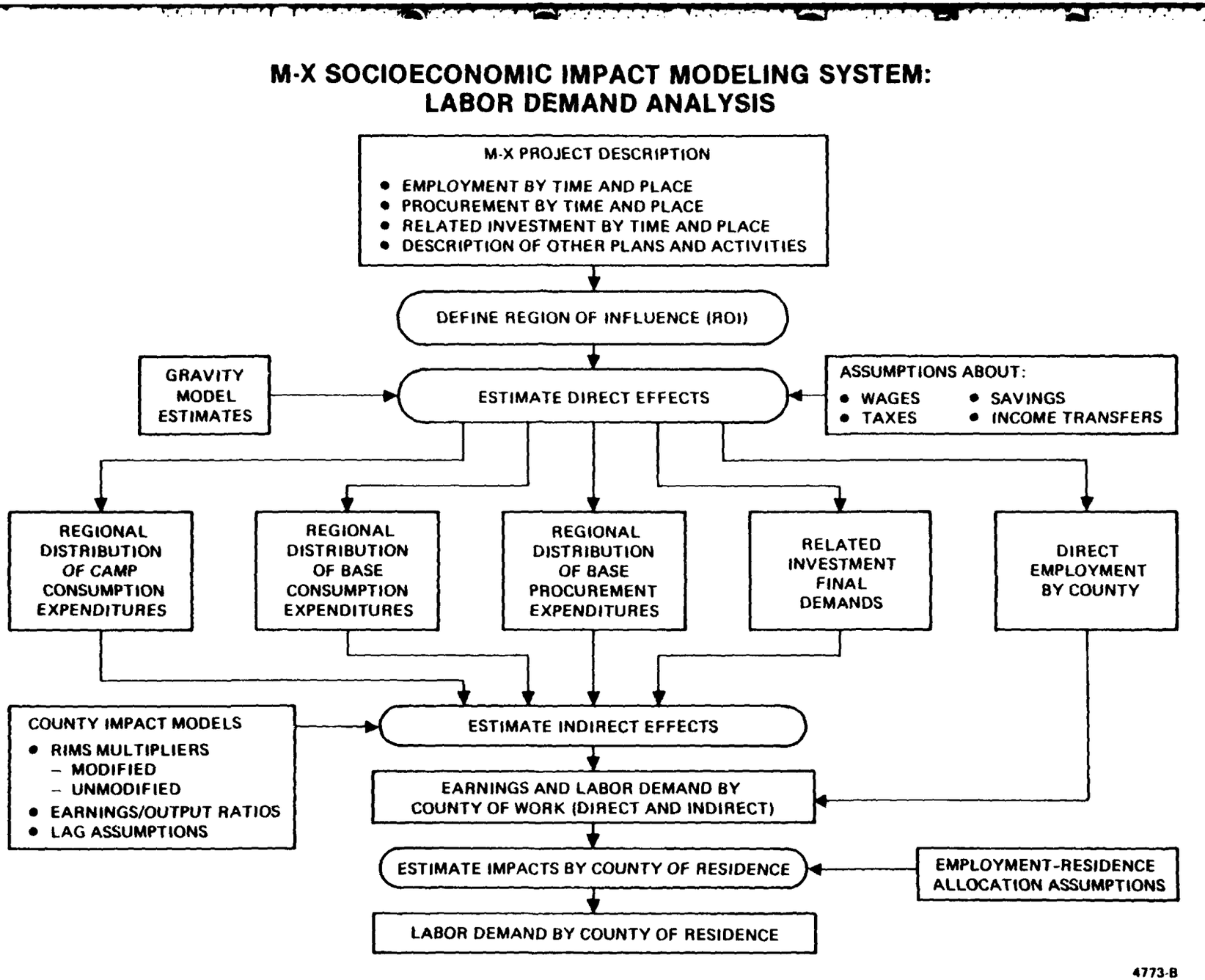

M-X SOCIOECONOMIC IMPACT MODELING SYSTEM:
LABOR DEMAND ANALYSIS
M-X PROJECT DESCRIPTION
• EMPLOYMENT BY TIME AND PLACE
• PROCUREMENT BY TIME AND PLACE
• RELATED INVESTMENT BY TIME AND PLACE
• DESCRIPTION OF OTHER PLANS AND ACTIVITIES
DEFINE REGION OF INFLUENCE (ROI)
GRAVITY MODEL ESTIMATES
ESTIMATE DIRECT EFFECTS
ASSUMPTIONS ABOUT:
• WAGES
• SAVINGS
• TAXES
• INCOME TRANSFERS
REGIONAL DISTRIBUTION OF CAMP CONSUMPTION EXPENDITURES
REGIONAL DISTRIBUTION OF BASE CONSUMPTION EXPENDITURES
REGIONAL DISTRIBUTION OF BASE PROCUREMENT EXPENDITURES
RELATED INVESTMENT FINAL DEMANDS
DIRECT EMPLOYMENT BY COUNTY
COUNTY IMPACT MODELS
• RIMS MULTIPLIERS
– MODIFIED
– UNMODIFIED
• EARNINGS/OUTPUT RATIOS
• LAG ASSUMPTIONS
ESTIMATE INDIRECT EFFECTS
EARNINGS AND LABOR DEMAND BY COUNTY OF WORK (DIRECT AND INDIRECT)
ESTIMATE IMPACTS BY COUNTY OF RESIDENCE
EMPLOYMENT-RESIDENCE ALLOCATION ASSUMPTIONS
LABOR DEMAND BY COUNTY OF RESIDENCE
4773-B

Figure 1-1.

M-X SOCIOECONOMIC IMPACT MODELING SYSTEM: LABOR SUPPLY ANALYSIS

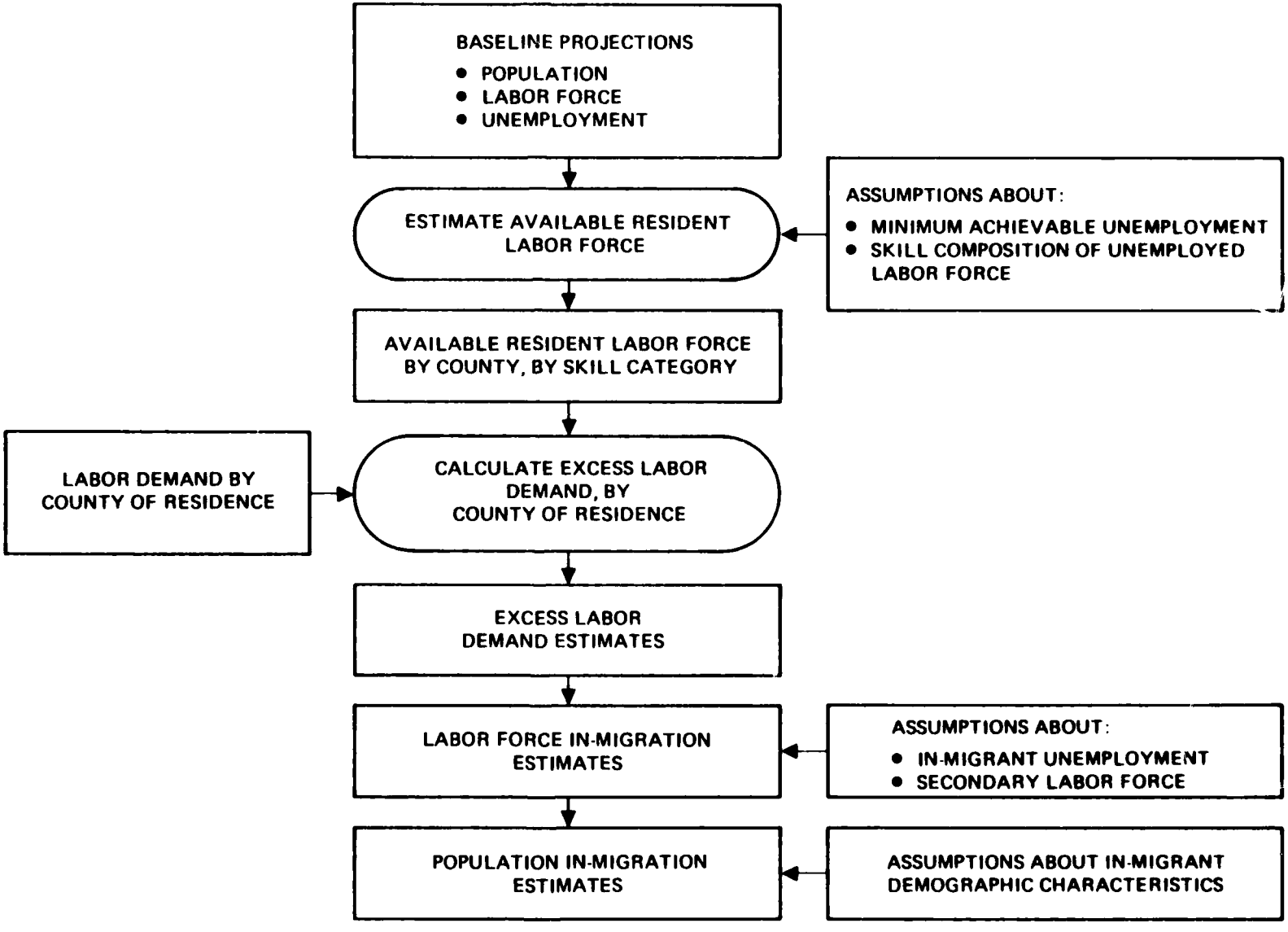


Figure 1-2.

M-X SOCIOECONOMIC IMPACT MODELING SYSTEM: POPULATION, PLANNING, AND PUBLIC FINANCE ANALYSIS

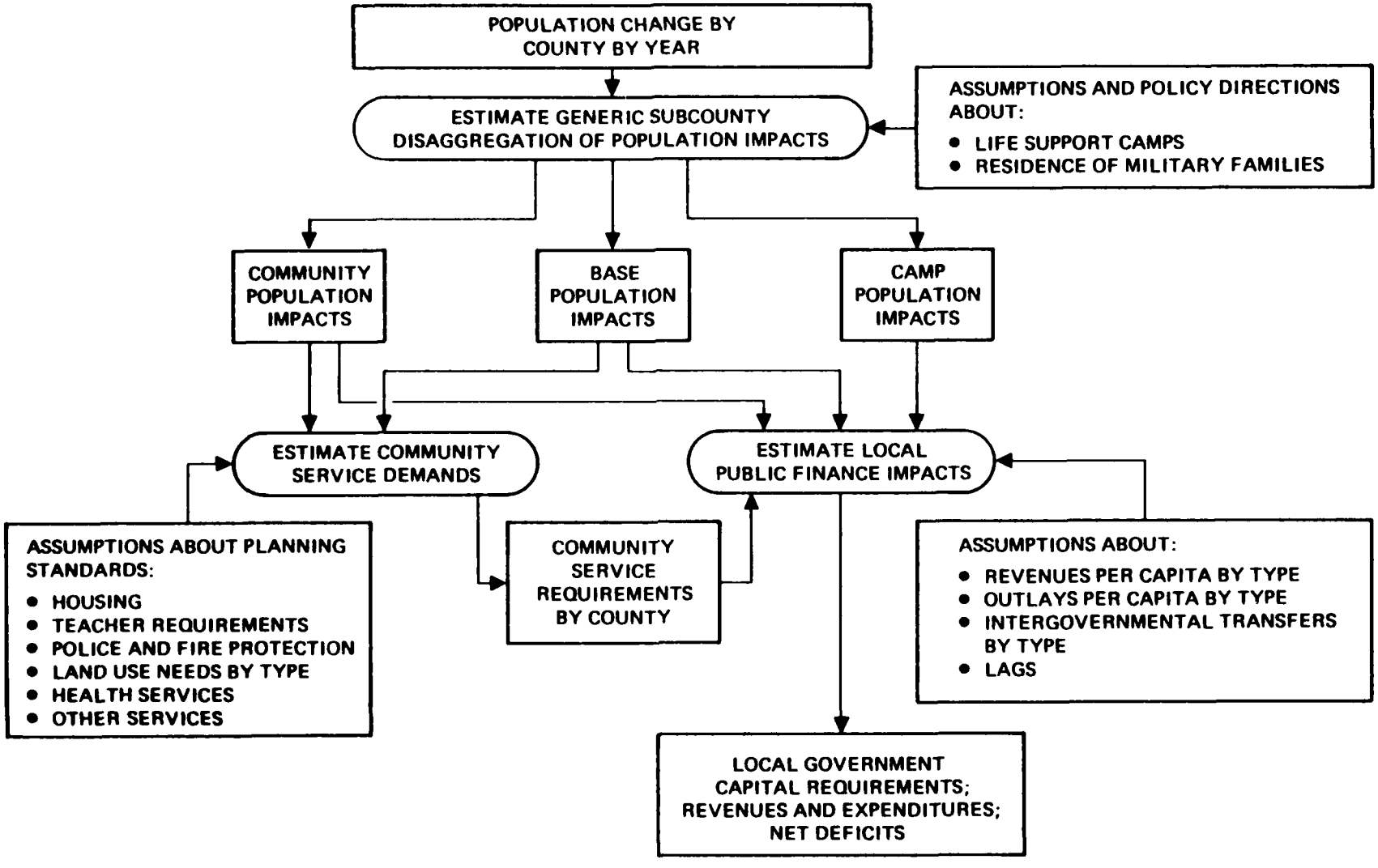


Figure 1-3.

demands for goods and services, and other related investment outlays. Payroll and income transfer assumptions are presented in Section 2.3. Section 2.4 discusses the procedures used to estimate the distribution of consumption expenditures across the deployment regions. Appendices F and G present camp and base payroll expenditure projections by county resulting from this analysis. Section 2.5 presents assumptions regarding procurement demands for construction resources and goods and services for base operations. Appendix H presents operations procurement figures by county. Project-related investments in community infrastructure in those ROI towns where significant long-term population growth is forecast are explained in Section 2.6 and set out in detail in Appendix C.

The distribution of direct effects within the ROI counties is then used to estimate the indirect effects of M-X deployment on the regional economy. The indirect effects estimated in this analysis are indirect gross output changes, earnings changes, and employment changes. Indirect impacts are estimated using county-level impact models based on the Regional Industrial Multiplier System (RIMS). These county-level models are explained in Section 3. The RIMS approach and relevant estimating equations are detailed in Appendix D. Section 3.1 presents the RIMS multiplier equation and key parameter estimates for ROI counties. Two types of RIMS multipliers are utilized: (1) modified multipliers explicitly adjusted for structural change in ROI county economies, and (2) unmodified multipliers estimated on the basis of historic economic patterns in a given county. Section 3.2 explains the basis for adjusting the multipliers, and presents the industrial data underlying these modifications. Section 3.3 presents modified and unmodified multipliers used in the ROI counties. Multipliers are combined with estimated earnings/output ratios and specific lag assumptions to estimate changes in gross output and earnings (labor and proprietors income) in the regional economies as a result of M-X deployment. These data and assumptions are presented in Section 3.4. Estimates of earnings per worker, presented in Section 2.3, are used to calculate indirect employment associated with the M-X project.

Section 4 presents methodologies, assumptions and data for estimating employment and population impacts by county of residence. Calculations of total M-X-related earnings and labor demand by county of work have been made, utilizing estimates of earnings and labor demand indirectly associated with M-X deployment, combined with direct earnings and employment estimates at the county level. Using specific assumptions about cross-county commuting (employment-residence allocation assumptions), M-X-related employment by county of work is translated into employment impacts by county of residence. Section 4.1 presents the required assumptions for the employment-residence adjustment. Labor demand by county of residence can then be compared to the local labor supply to estimate labor force in-migration.

Figure 1-2 presents the principal components of the labor supply analysis used in this report. Key assumptions and methodology underlying estimates of the available resident labor force are presented in Section 4.2. The analysis uses the best available (exogenous) baseline projections of population, and combines these with assumptions about labor force participation rates and unemployment rates to estimate total labor force, employment, and unemployment for each year included in the analysis. These projections then are used to determine the resident labor force available for M-X-related employment. The available resident labor force represents the level of M-X-related labor demand which can be met from the local

labor force. Beyond this level of labor demand, labor force in-migration would occur. The analysis also makes assumptions about the skill composition of the unemployed labor force. These assumptions determine the size of the available resident labor force available for specific categories of M-X-related employment--construction, operations, and indirect employment--without labor force in-migration.

This labor supply analysis is based on increments to the exogenous baseline projections. As a consequence, the projected available resident labor force measures the number of persons who would have been unemployed without M-X but are potentially employable with M-X.

Section 4.3 details assumptions and analysis required to estimate regional excess labor demand. Estimates of the baseline local labor supply are compared to M-X-related labor demand by county of residence. Excess labor demand, if any, is calculated on a county-of-residence basis. These excess labor demand estimates are used to project labor force in-migration as a result of M-X. In addition, these labor force in-migration estimates rely on assumptions about unemployment or labor turnover among M-X in-migrants, as well as the size of the secondary labor force associated with these in-migrant workers. The model then calculates population in-migration as a result of M-X based on estimates of labor force in-migration and on assumptions about the demographic characteristics of the in-migrants.

Section 4.4 defines the manner by which the sub-county allocation of population was determined. This allocation procedure is based on assumptions and policy and planning directives about the characteristics of life-support camps and the place of residence of military families. The model estimates the sub-county distribution of population impacts among three different categories: community population impacts, base population impacts, and camp population impacts. Figure 1-3 summarizes the generic sub-county disaggregation of population impacts and the consequences of these population impacts for community services, infrastructure, and local governmental units.

The final two sections of this report present sample results and model validation. Section 5 takes model output for Clark County, Nevada, and discusses changes in employment, the projected procurement and project-related investment for that county, and M-X-induced growth in earnings. This section also presents sample results describing civilian labor force impacts and net population growth. Section 6 compares changes in employment in the Nevada/Utah ROI estimated by the economic model with results from the UPED 79 model, developed by the University of Utah's Bureau of Economic and Business Research. The UPED 79 model, a dynamic economic base simulation model, forecasts lower peak regional employment, but projects comparable results over the long run. At the county level, differences between the two models are somewhat larger.

The nine appendices present selected project requirements data and model output, as well as additional detail on assumptions and methodology utilized. They include:

Contents	Appendix
o DDA construction and assembly and checkout employment by county	Appendix A
o Construction worker daily subsistence estimates by craft	Appendix B
o Assumptions and calculations for project-related offbase public and private investment estimates	Appendix C
o Overview of the Regional Industrial Multiplier System	Appendix D
o Craft wage rates plus employer contributions for selected benefits, Nevada/Utah, August 1978	Appendix E
o Camp payroll expenditures by county	Appendix F
o Base payroll expenditures by county.	Appendix G
o Operations procurement by county	Appendix H
o Impact analysis for Lander, Esmeralda, and Tooele counties	Appendix I

The composition of population impacts estimated from the economic model is used to estimate such community service and infrastructure needs as housing, teacher requirements, police and fire protection, land use by type, health services, and other services. In addition, local and state government fiscal impacts are estimated based on the population impacts in each of the three categories--communities, bases, and construction camps--relying on assumptions about revenues and outlays by type per capita as well as on intergovernmental transfer assumptions. The community service and infrastructure model used in this analysis is documented in ETR-28 (Social Model). The local and state government fiscal impact methodologies are documented in ETR-29 (Public Finance Model).

2.0 DIRECT PROJECT EFFECTS: EMPLOYMENT, REGIONS OF INFLUENCE, AND PROJECT-RELATED EXPENDITURES

Deployment of the M-X system would require expenditures for labor and materials for construction, assembly and checkout, and operations. This section discusses the way these direct project impacts are estimated and distributed across the deployment regions.

2.1 M-X SYSTEM PERSONNEL REQUIREMENTS

Direct labor demands of the M-X system consist of three basic types:

- o construction of the Designated Deployment Area (DDA) and OB facilities;
- o assembly and checkout of the DDA and OB facilities; and
- o operation of system.

The M-X system's direct labor demands would be spread across a broad geographical area. Figures 2.1-1 through 2.1-4 display the locations of the Designated Deployment Area (DDA) camps where construction personnel and assembly and checkout workers are assumed to be employed for each of the full and split deployment alternatives considered.

Potential operating base (OB) locations - Coyote Spring and Ely, Nevada; Beryl, Milford, and Delta, Utah; Clovis, New Mexico; and Dalhart, Texas - also represent the places of employment for operating base construction, assembly and checkout, and operations personnel employed on the project.

Table 2.1-1 shows locations of operating bases for the Proposed Action and the eight alternatives. The Proposed Action and Alternatives 1 through 6 are sited completely in Nevada/Utah. Alternative 7 would be located entirely in Texas/New Mexico. The split deployment option (Alternative 8) would locate an operating base in Coyote Spring Valley, Nevada, and one-half of the missile force (100 missiles) in Nevada/Utah. Split deployment also would require a base at Clovis, New Mexico, and one-half of the missiles in Texas/New Mexico.

Personnel requirements data are presented in the FEIS. Tables 4.3.3.1-4 through 4.3.3.1-7 of the FEIS present direct labor requirements for the Proposed Action and Alternatives 1, 2, 4, and 6; Tables 4.3.3.1-11 through 4.3.3.1-14, Alternatives 3 and 5; Tables 4.3.3.1-16 through 4.3.3.1-18, Alternative 7; Tables 4.3.3.1-21 through 4.3.3.1-24, split deployment, Nevada/Utah; and Tables 4.3.3.1-27 through 4.3.3.1-30 detail labor requirements for split basing, Texas/New Mexico.

Operations employment as defined in this study include officers, enlisted personnel, and civilians. The construction camp numbers in Figures 2.1-1 through 2.1-4 correspond to camp numbers shown in the employment tables for DDA construction and assembly and checkout (see Tables 4.3.3.1-5, 4.3.3.1-6, 4.3.3.1-12, 4.3.3.1-13, 4.3.3.1-17, 4.3.3.1-18, 4.3.3.1-22, 4.3.3.1-23, 4.3.3.1-28, and 4.3.3.1-29 in Chapter 4 of the FEIS).

IC Hank

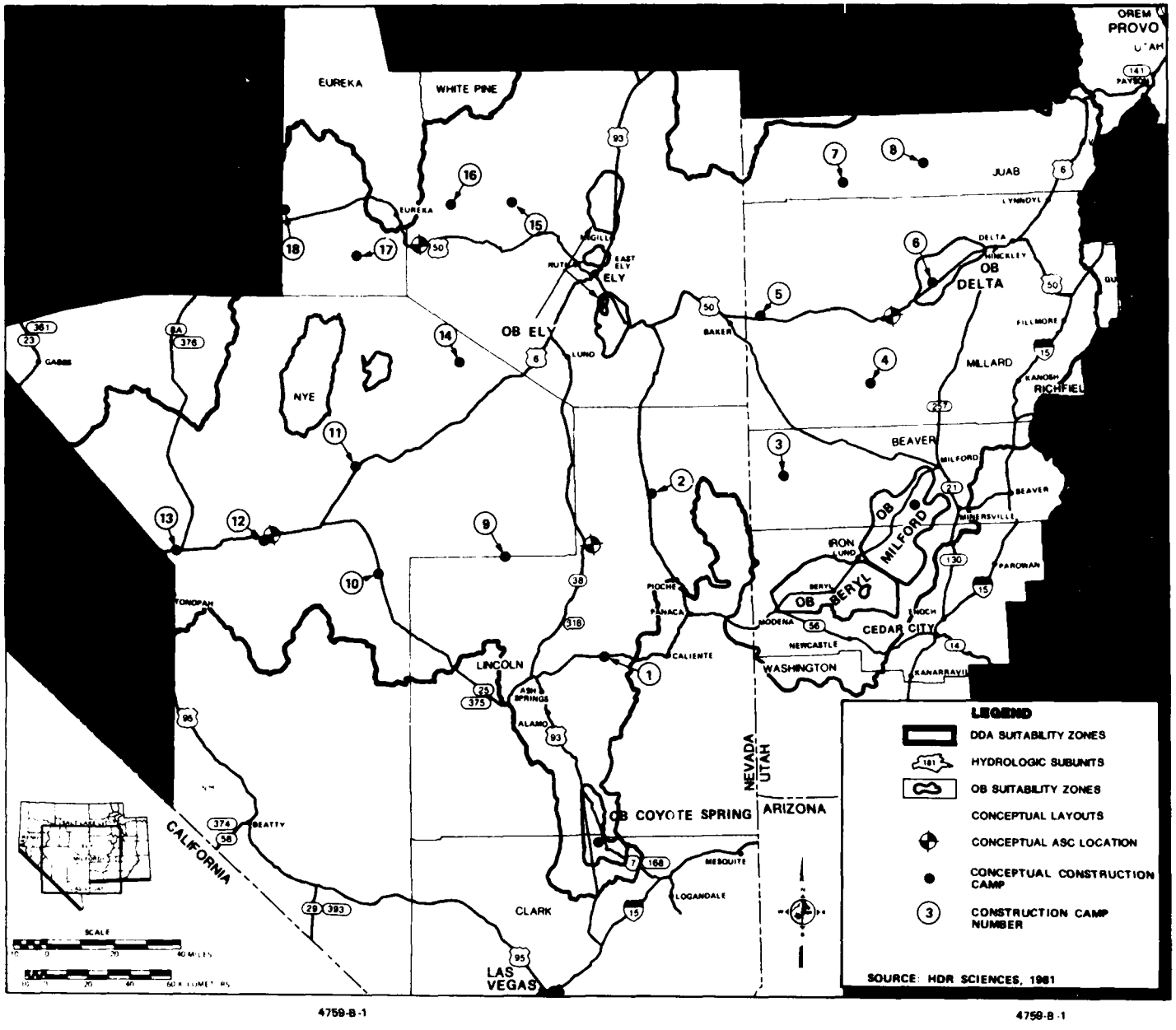


Figure 2.1-1. Proposed locations of OBs and construction camps under the Proposed Action and all Nevada/Utah full deployment alternatives.

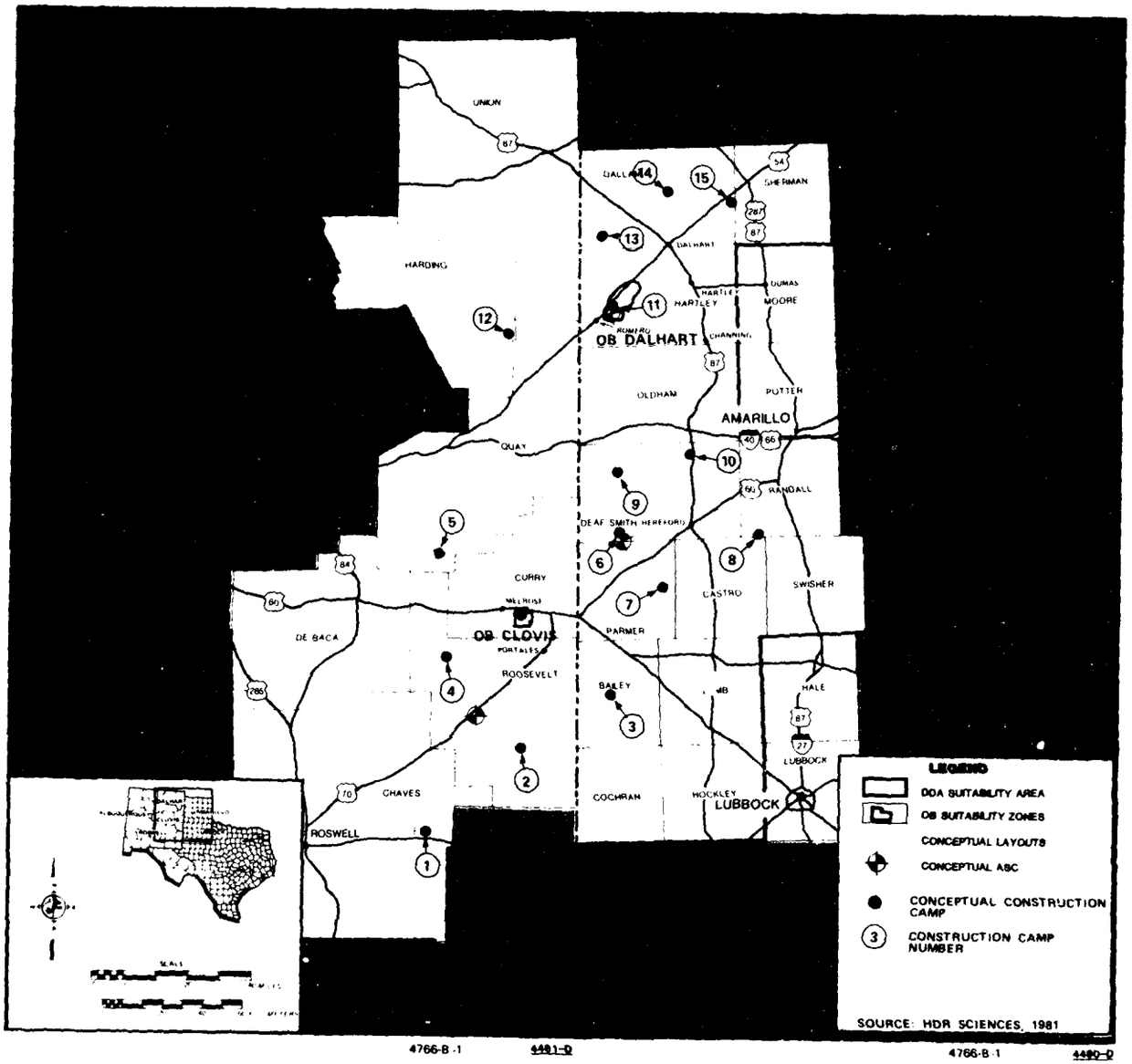


Figure 2.1-2. Proposed locations of OBs and construction camps under Alternative 7, full deployment, Texas/New Mexico.

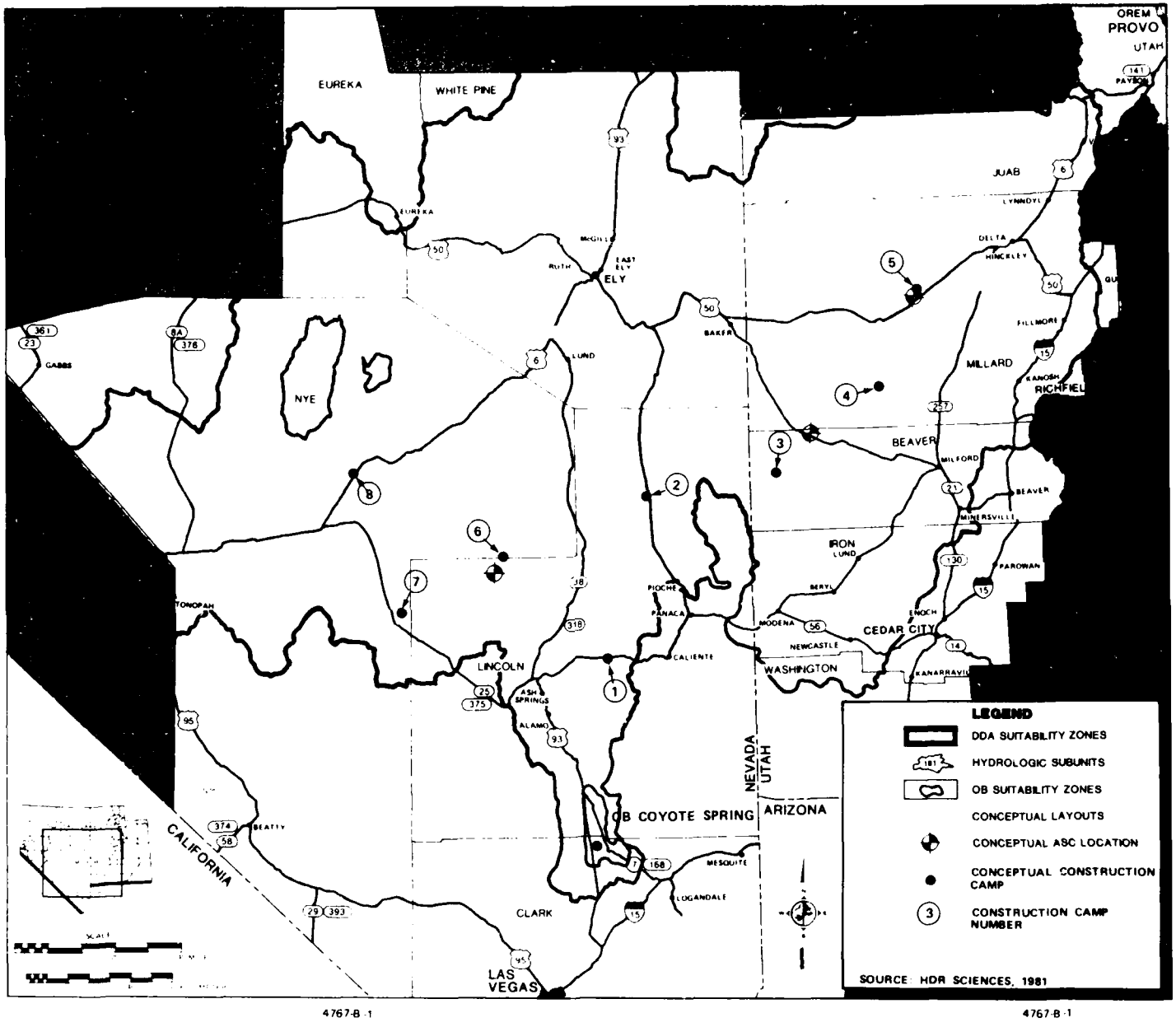


Figure 2.1-3. Proposed locations of OBs and construction camps under Alternative 8, split deployment, Texas/New Mexico.

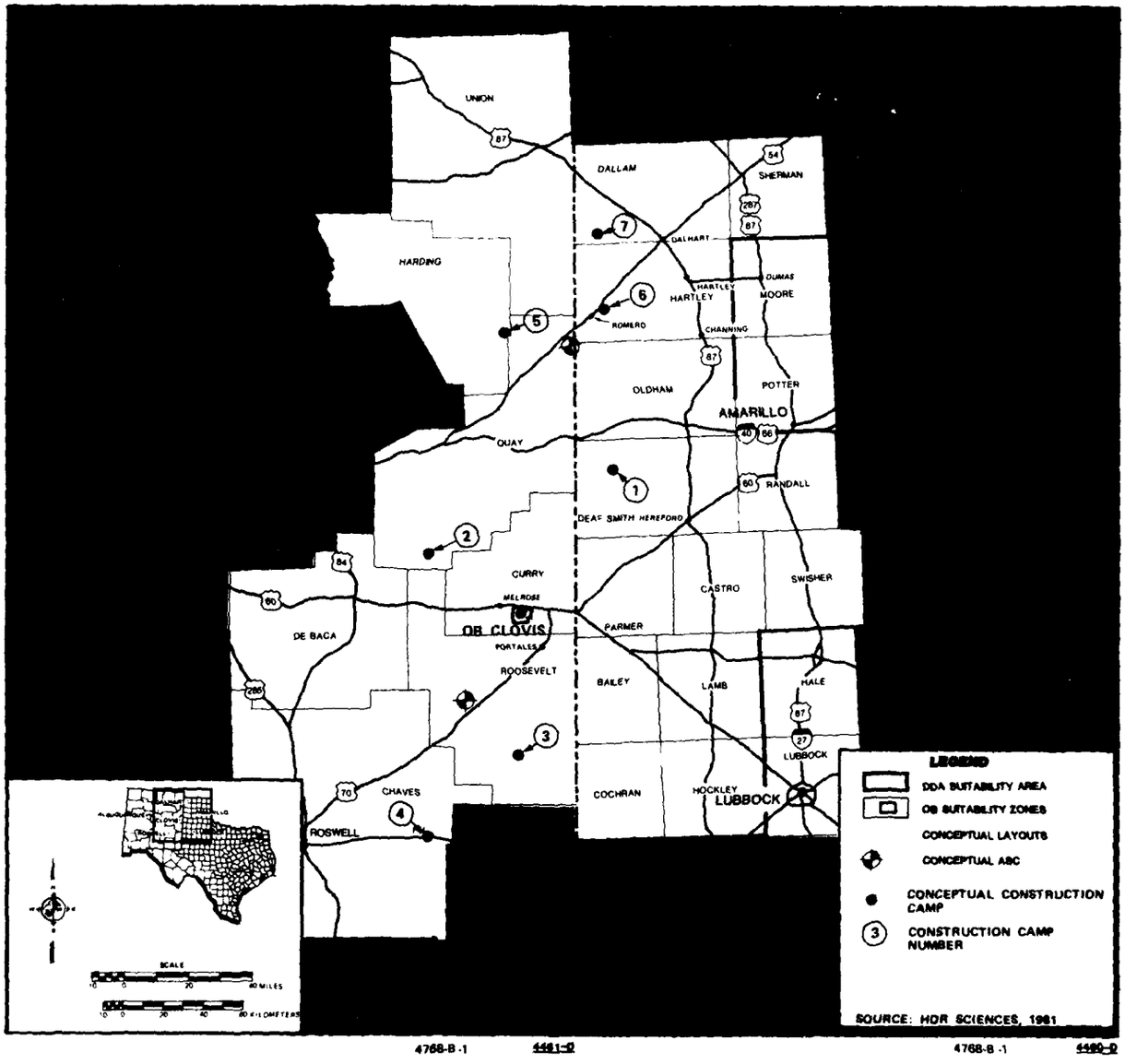


Figure 2.1-4. Proposed locations of OBs and construction camps under Alternative 8, split deployment, Texas/New Mexico.

Table 2.1-1. Locations of operating bases for the Proposed Action and alternatives analyzed in the M-X deployment area selection and land withdrawal environmental impact statement.

Alternative	First Base[1]	Second Base[2]	Figure Number
Proposed Action	Coyote Spring Valley, Nev.	Milford, Utah	2.1-1
Alternative 1	Coyote Spring Valley, Nev.	Beryl, Utah	2.1-1
Alternative 2	Coyote Spring Valley, Nev.	Delta, Utah	2.1-1
Alternative 3	Beryl, Utah	Ely, Nev.	2.1-1
Alternative 4	Beryl, Utah	Coyote Spring Valley, Nev.	2.1-1
Alternative 5	Milford, Utah	Ely, Nev.	2.1-1
Alternative 6	Milford, Utah	Coyote Spring Valley, Nev.	2.1-1
Alternative 7	Clovis, N.Mex.	Dalhart, Texas	2.1-2
Alternative 8[3]	Coyote Spring Valley, Nev.	Clovis, N.Mex.	2.1-3; 2.1-4

T3971/10-27-81

[1]First Base includes DDA, OBTS, and OB.

[2]Second Base for proposed action and Alternatives 1-7 includes just the OB; for split basing (Alternative 8, the second base includes DDA and OB, but no OBTS.

[3]Deployment for split basing includes 100 missiles in the Nevada/Utah region and 100 missiles in the Texas/New Mexico region.

Source: U.S. Air Force, Ballistic Missile Office.

General trends in direct employment are visible from a survey of full deployment requirements in Nevada/Utah. M-X employment would start in 1982, with most employment initially concentrated in construction trades. M-X construction employment would peak at more than 18,000 workers in 1986. Direct project employment in all categories - construction, assembly and checkout, and operations - is expected to surpass 30,000 jobs from 1986 through 1988. Direct M-X employment would diminish rapidly thereafter, reaching a long-term level of 13,330 in 1991, which would continue as long as the system remained in operation.

Construction camps dispersed throughout the ROI would represent points of employment for personnel engaged in construction and assembly and checkout of the Designated Deployment Area (DDA) facilities (Figure 2.1-1). The regional distribution of employment shown in these tables is critical since these construction camps would be employment centers for more than 17,600 persons at the peak of DDA construction and assembly and checkout activity (1986). A total of 18 camps would be distributed over the region, with activity at each camp for a four- to six-year period between 1982 and 1990. As many as 2,800 workers could be based in a camp in the peak year of its activity. Just as employment growth is projected to be very rapid, decline of employment (construction jobs particularly) would also occur rapidly, leaving little time for regional adjustment.

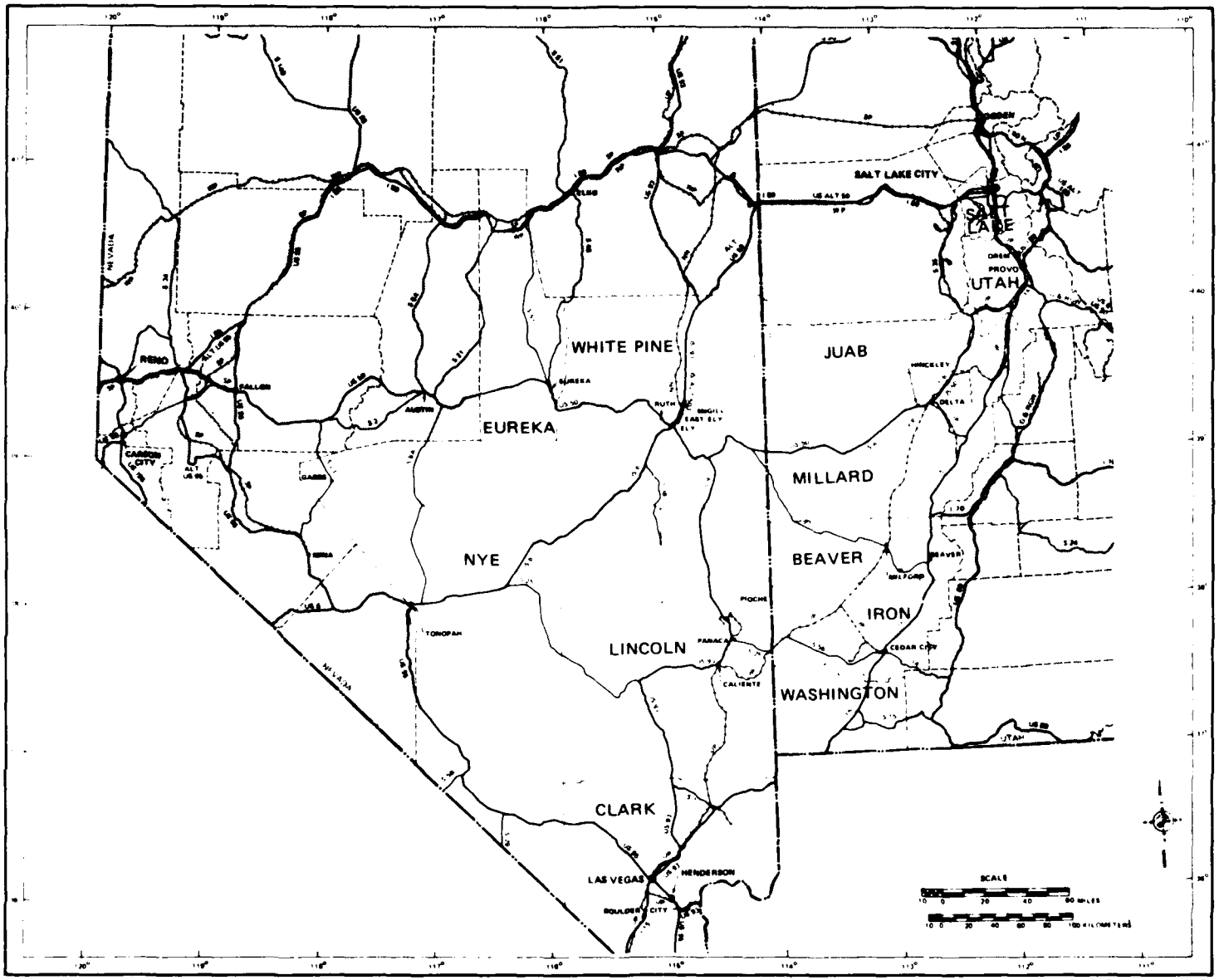
Appendix A presents DDA construction and A&CO employment at the county level on the basis of place of employment according to the counties where camps would be located.

2.2 REGIONS OF INFLUENCE

The areas subjected to detailed analysis in this study are illustrated in Figures 2.2-1 and 2.2-2. These areas include the locations of much of the economic activity resulting from the project. They also include those areas where impacts potentially would be large compared to the level of economic activity without the project. The regions of influence contain the places of employment of all construction, assembly and checkout, and operations personnel identified in section 2.1.

Both the Nevada/Utah and Texas/New Mexico ROIs include areas where impacts could potentially be large compared to the level of economic activity without the project. They also include large urban places on the fringes of the rural deployment areas themselves. These metropolitan areas could potentially experience substantial indirect employment growth as a result of the project, and consequently are included in the regions of influence.

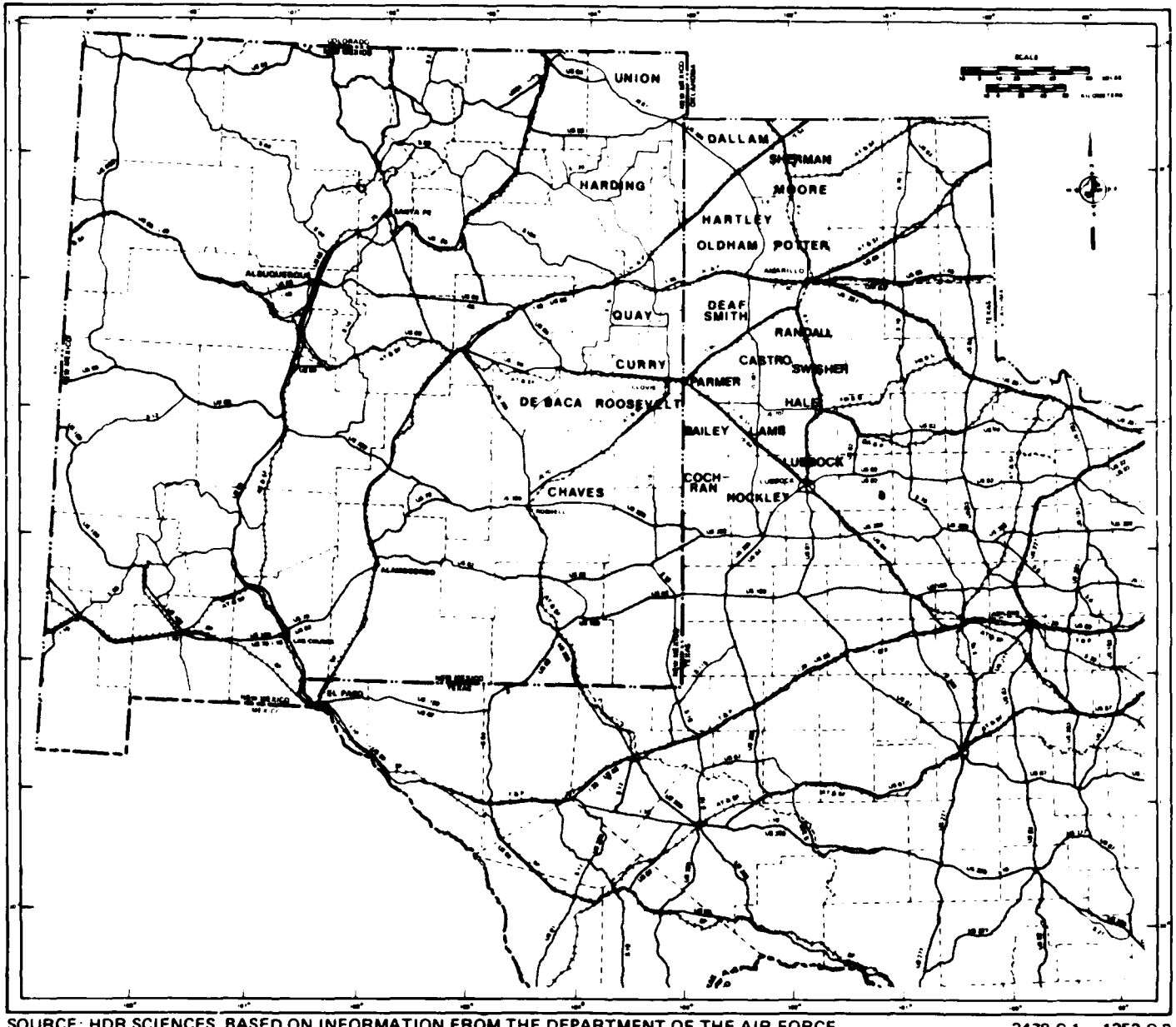
Both regions of influence have been defined as contiguous areas surrounding the deployment sites. The Reno, Nevada SMSA (Standard Metropolitan Statistical Area) has been excluded from the Nevada/Utah region of influence, as have the Los Angeles and San Francisco SMSAs. Some indirect employment and other economic effects would no doubt occur in these areas, though the level of this indirect activity would likely be quite small compared to the economies of these metropolitan centers. Dallas-Fort Worth, El Paso, Oklahoma City, and Albuquerque likewise have been excluded from the Texas/New Mexico ROI because of the limited nature of secondary impacts in these SMSAs. The "leakage" of expenditures from the ROI to these areas has been taken into account in this analysis.



SOURCE: HDR SCIENCES, BASED ON INFORMATION FROM THE DEPARTMENT OF THE AIR FORCE, BMO (AFSC), AND OTHER STATE AND FEDERAL AGENCIES.

1918-C-2 1040-C

Figure 2.2-1. Nevada/Utah region of influence.



SOURCE: HDR SCIENCES, BASED ON INFORMATION FROM THE DEPARTMENT OF THE AIR FORCE, BMO (AFSC), AND OTHER FEDERAL AND STATE AGENCIES.

2478-C-1 1252-C-2

Figure 2.2-2. Texas/New Mexico region of influence.

Several counties in both ROIs were excluded from detailed socioeconomic analysis even though they would contain DDA facilities. Esmeralda and Lander counties in Nevada, Tooele County in Utah, and Lea and Guadalupe counties in New Mexico would contain M-X shelter facilities and roads through these counties have not been included in the modeling system. It may be possible to avoid locating facilities in Lea and Guadalupe counties, even with full deployment in Texas/New Mexico. No construction camps are projected to be located in these counties. Workers presumably would travel on a daily basis from the camps to work sites in the excluded counties, returning after each day's work. Moreover, the camp locations are closer to communities within the ROIs defined in Figures 2.2-1 and 2.2-2 than to communities in these five excluded counties. This would imply minimal spillovers effects into the excluded counties. Consequently, impacts in these five counties would be much smaller than in adjacent counties included in the formally defined ROI. The impacts which would occur probably would consist of expanded restaurant and service establishments oriented to supplying worker demands during the work day. See Appendix I for a separate analysis of potential impacts to Lander, Esmeralda, and Tooele counties.

2.3 PAYROLL AND INCOME TRANSFER ASSUMPTIONS

EMPLOYEE EARNINGS (2.3.1)

Table 2.3-1 displays the earnings-per-worker assumptions used in the M-X economic analysis. M-X construction workers are projected to earn in excess of $30,000 per year (in FY 1980 dollars) including overtime earnings and subsistence pay. Construction workers in Nevada/Utah are projected to receive an average of $37,110 per year, and $32,270 per year in Texas/New Mexico. Assembly and checkout workers and military officers are expected to receive approximately $25,000 and $25,800 per year respectively, civilian operations personnel, $19,700 per year, and enlisted personnel earnings would be $11,400 per year. Workers indirectly employed by M-X are projected to receive $14,500 per year in Nevada/Utah and slightly less--$14,460 per year--in Texas/New Mexico.

The earnings estimates for assembly and checkout workers, officers, civilian operations personnel and enlisted personnel were supplied by the U.S. Air Force, Ballistic Missile Office. Construction worker earnings have been estimated using data presented in Tables 2.3-2 through 2.3-9. Earnings of indirect M-X employees have been estimated using data presented in Tables 2.3-10 through 2.3-15 of this report.

Construction Earnings

The average construction worker earnings presented in Table 2.3-1 have been derived from craft-specific labor requirements and wage rates. Table 2.3-2 presents total construction labor requirements by year for 21 occupational categories for the Proposed Action for the years 1982-89. These estimates were derived by the task force for manpower requirements in March 1981. Project demands would be greatest for: (1) operating engineers--a total of more than 13,000 work-years during the 1982-89 period; (2) camp and kitchen workers, with requirements for more than 12,000 work-years during the construction period; (3) laborers, with a demand in excess of 10,000 work-years; (4) overhead workers, at about 9,500 work-years; and (5) Corps of Engineers personnel at more than 7,000 work-years from 1982 through 1989.

Table 2.3-1. Annual earnings-per-worker assumptions for M-X economic impact analysis (FY 1980 dollars per year).

Employment Type	Earnings Assumption Fiscal Year 1980 Dollars
Construction workers[1]	
Nevada/Utah	37,110
Texas/New Mexico	32,270
Assembly and checkout workers	25,000
Officers	25,800
Enlisted personnel	11,400
Civilian operations personnel	19,700
Indirect employees	
Nevada/Utah	14,500
Texas/New Mexico	14,460

T2340/9-24-81/F

[1] Assumes 2,080-hour-year and is based on an average of trades required. It also includes $5,400 subsistence allowance. See following tables.

Sources: Construction - See following tables.
A & CO - U.S. Air Force, Ballistic Missile Office.
Operations (Officers, enlisted personnel, and civilians) - U.S. Air Force, Ballistic Missile Office.
Indirect - U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System, 1981.

Table 2.3-2. Construction personnel requirements by craft, Proposed Action, 1982-89 (work years).

Craft[1]	Number of Work-Years								
	1982	1983	1984	1985	1986	1987	1988	1989	1982-89 Total
Repair & Service	42.6	159.7	304.4	782.3	824.0	798.4	675.5	292.8	3,879.7
Carpenters	102.3	250.8	306.1	558.2	451.2	420.9	272.7	66.5	2,428.7
Electricians	166.5	325.6	638.8	835.6	1,222.6	1,092.3	507.3	424.5	5,213.2
Ironworkers	130.0	288.9	543.6	1,062.6	833.9	909.0	732.0	185.3	4,685.3
Millwrights	--	--	10.9	112.1	117.7	121.8	121.6	52.0	536.1
Cement Masons	10.6	24.9	28.5	40.6	34.1	28.0	10.0	0.9	177.6
Operating Engineers	269.8	851.8	1,595.2	2,626.5	2,747.1	2,592.4	1,833.7	749.1	13,265.6
Painters	4.7	10.1	10.9	44.1	50.7	46.9	39.6	17.1	224.1
Pipefitters	1.1	6.0	16.8	87.4	90.2	89.2	88.0	35.0	413.7
Plasterers	0.2	0.5	0.5	0.7	0.7	0.5	0.1	--	3.2
Plumbers	18.5	39.1	39.2	59.8	49.5	39.3	9.6	--	255.0
Teamsters	77.8	270.7	511.4	916.2	1,024.3	933.0	728.2	396.8	4,858.4
Tilesetters	4.3	9.1	8.5	8.1	4.8	3.2	--	--	38.0
Laborers	254.3	783.5	1,078.2	2,223.5	2,212.5	2,030.4	1,494.2	615.4	10,692.0
Piledrivers	--	--	7.9	287.2	320.7	317.2	314.0	144.9	1,391.9
Track Crew	--	10.6	20.3	13.3	19.7	20.9	4.7	--	89.5
Other Crafts	11.3	23.8	23.9	36.5	30.2	23.9	5.8	--	155.4
Clerical-Professional	--	--	31.9	114.2	100.9	118.5	121.4	41.8	528.7
Camp & Kitchen	276.8	769.7	1,303.8	2,341.1	2,536.5	2,356.7	1,733.8	750.3	12,068.7
Security	47.3	131.7	222.8	421.4	431.7	410.8	297.0	128.1	2,090.8
Overhead	215.3	591.6	1,006.6	1,895.6	1,964.5	1,871.0	1,350.8	582.6	9,478.0
Subtotal	1,633.4	4,548.1	7,710.2	14,467.0	15,067.5	14,224.3	10,340.0	4,483.1	72,473.6
Corps of Engineers[2]	163.3	454.8	771.0	1,446.7	1,506.8	1,422.4	1,034.0	448.3	7,247.3
Contingency[3]	215.6	600.3	1,017.7	1,909.6	1,988.9	1,877.6	1,364.9	591.8	9,566.4
Total	2,012.0	5,603.2	9,498.9	17,823.3[4]	18,563.2	17,524.3	12,738.9	5,523.2	89,287.3

T5320/10-27-81

[1]Four crafts not shown--roofers, boilermakers, insulators, and sheet-metal workers--were considered in the analysis, but current estimates indicate no need for workers in these trades.

[2]Estimated as 10 percent of the subtotal.

[3]Estimated as 12 percent of the subtotal plus Corps of Engineers.

[4]The data source contained an addition error in calculating the subtotal for 1985. This error has been corrected in this table and the Corps of Engineers and contingency estimates have been revised to be consistent with the corrected subtotal.

Source: U.S. Air Force, AFRCE/MX, Task Force for Manpower Requirements, "Craft Study," Attachment 6, 19 March 1981.

Table 2.3-3. Cumulative 1982-89 construction labor requirements, by craft, and cumulative percentage share of crafts in total construction labor (work-years) (Page 1 of 2).

Craft	Unadjusted 1982-89 Totals	Adjustment Factors		Adjusted 1982-89 Totals[4]	Percent Distribution
		Track Crew and Other[2]	Contingency[3]		
Repair & Service	3,879.7	19.8	467.0	4,366.5	4.89
Carpenters	2,428.7	12.4	292.3	2,733.4	3.06
Electricians	5,213.2	26.6	627.5	5,867.3	6.57
Ironworkers	4,685.3	23.9	564.0	5,273.2	5.91
Millwrights	536.1	2.7	64.5	603.3	0.68
Cement Masons	177.6	0.9	21.4	199.9	0.22
Operating Engineers	13,265.6	67.6	1,596.8	14,930.0	16.72
Painters	224.1	1.1	27.0	252.2	0.28
Pipefitters	413.7	2.1	49.8	465.6	0.52
Plasterers	3.2	0.0	0.4	3.6	0.00
Plumbers	255.0	1.3	30.7	287.0	0.32
Teamsters	4,858.4	24.8	584.8	5,468.0	6.12
Tilesetters	38.0	0.2	4.6	42.8	0.05
Laborers	10,692.0	54.5	1,287.0	12,033.5	13.48
Piledrivers	1,391.9	7.1	167.5	1,566.5	1.75
Subtotal	48,062.5	244.9	5,785.2	54,092.6	60.58

T5321/9-29-81

Table 2.3-3. Cumulative 1982-89 construction labor requirements, by craft, and cumulative percentage share of crafts in total construction labor (work-years) (Page 2 of 2).

Craft	Unadjusted 1982-89 Totals	Adjustment Factors		Adjusted 1982-89 Totals[4]	Percent Distribution
		Track Crew and Other[2]	Contingency[3]		
Camp & Kitchen	12,068.7	--	1,452.7	13,521.4	15.14
Security	2,090.8	--	251.7	2,342.5	2.62
OH,Cler., Prof., & COE	17,254.0	--	2,076.8	19,330.8	21.66
Total	79,476.0[1]	244.9	9,566.4	89,287.3	100.00

T5321/9-29-81

[1]Excludes contingency, track crew, and other crafts.

[2]A total of 244.9 work-years are distributed over the other crafts according to the proportion of each craft in the craft labor subtotal (48,062.5 work-years).

[3]The 12 percent contingency factor (9,566.4 work-years) is distributed over all the crafts and other occupations shown according to the proportion of each occupation in the total (79,476.0 work-years).

[4]Adjusted totals are the sum of the unadjusted totals and the adjustment factors shown.

Source: Calculations by HDR Sciences based on data from U.S. Air Force AFRCE/MX, Task Force for Manpower Requirements, "Craft Study," Attachment 6, 19 March 1981.

Table 2.3-4. Total hours required, total payroll, and average hourly rate by craft, DDA facilities construction in Nevada/Utah.

Craft	Total Hours Required	Total Payroll	Hourly Rate[1]
Carpenters	3,728,142	52,894,885	14.19
Electricians	2,960,116	53,685,592	18.14
Ironworkers	8,080,300	128,046,815	15.85
Laborers	20,107,746	216,887,547	10.79
Cement Masons	105,736	1,478,189	13.98
Millwrights	1,314,240	18,656,233	14.20
Operating Engineers	24,481,697	397,965,255	16.26
Painters	480,086	7,144,423	14.88
Piledrivers	3,694,234	51,626,886	13.97
Pipefitters	936,440	15,338,343	16.38
Plasterers	2,051	28,676	13.98
Plumbers	149,058	2,430,031	16.30
Teamsters	10,335,922	128,946,192	12.48
Tilesetters	87,115	1,217,871	13.98
Tunnel & Shaft Workers	210,000	2,238,900	10.66
Camp Operations Workers	26,682,942	204,610,213	7.67
Security	2,498,196	15,969,272	6.39
Clerical, Professional, and Managerial	982,488	9,167,591	9.33

T5322/9-29-81

[1]Includes employer contributions for selected benefits. Dollars are August 1978 dollars.

Source: R.M. Parsons and Co., M-X Verifiable Horizontal MPS Construction Concepts Investigation: Operational Construction Cost Estimate, January 1981, "Labor-Project Requirements."

Note: Hourly rates shown are weighted averages of rates for numerous sub-craft categories, with weights determined by the relative proportions of sub-crafts in total DDA requirements for each craft. For example, operating engineers include many types of equipment operations and foremen earning from $14.88 to $18.46 per hour (1978 dollars). The figure of $16.26 shown in the table is a weighted average of these rates. See Appendix E for a more detailed disaggregation of wage and hour data.

Table 2.3-5. Average wage rates plus employer contributions for selected benefits, by trade: Southwest, Mountain, and Pacific regions and Nevada/Utah, July-August 1978.

Trade	Dollars Per Hour					Ratio, Southwest and Mountain Average, to Nevada/Utah (Percent)
	Southwest	Mountain	Pacific	Nevada/ Utah	Average, Southwest and Mountain	
Carpenters	10.52	12.25	15.39	14.02	11.39	81.2
Cement Finishers	10.89	12.12	14.94	13.98	11.51	82.3
Electricians	12.11	14.02	17.13	17.79	13.07	73.5
Painters	10.71	11.85	14.32	15.00	11.28	75.2
Pipefitters	12.37	13.78	18.01	16.18	13.08	80.8
Plasterers	10.90	12.16	15.07	13.98	11.53	82.5
Plumbers	11.25	13.61	18.03	16.18	12.43	76.8
Reinf. Iron Workers	10.89	13.83	16.09	16.09	12.36	76.8
Struc. Iron Workers	11.47	13.47	16.31	16.13	12.47	77.3
Tile Layers	10.24	11.66	14.48	13.98	10.95	78.3
Building Laborers	7.77	9.42	12.34	10.60	8.60	81.1

T5323/9-2-81

Sources: For Southwest, Mountain, and Pacific regions, U.S. Department of Labor, Bureau of Labor Statistics, Union Wage and Benefits: Building Trades, July 3, 1978, Washington, D.C., Sept. 1979, p.16. For Nevada/Utah, R.M. Parsons & Co., M-X Verifiable Horizontal MPS Construction Concepts Investigation: Operational Construction Cost Estimate, Oct. 1980, Sec. H.

Note: Southwest region includes Texas, Arkansas, Louisiana, and Oklahoma. Mountain region includes New Mexico, Utah, Arizona, Colorado, Idaho, Montana, and Wyoming. Pacific region includes Nevada, Alaska, California, Hawaii, Oregon, and Washington. Rates for Southwest, Mountain, and Pacific regions are those prevailing on July 3, 1978. Nevada/Utah data are an average of rates quoted by union business offices in the Las Vegas and Reno, Nevada, and Salt Lake City, Utah, areas in August 1978.

Table 2.3-6. Average annual wage and salary payments, employment, and payments per worker in construction, Nevada, Utah, Texas, and New Mexico, 1979.

State	1979 Wage and Salary Payments (Thousand Dollars)	1979 Wage and Salary Employment (Number Jobs)	1979 Payments Per Worker (Dollars)
Nevada	537,719	27,715	19,402
Utah	528,424	35,208	15,009
Texas	6,334,094	418,040	15,152
New Mexico	456,120	35,590	12,816
Nevada/Utah Total or Average[1]	1,066,143	62,923	16,944
Texas/New Mexico Total or Average[1]	6,790,214	453,630	14,969
Ratio, Texas/New Mexico to Nevada/Utah			0.883

T5324/9-29-81

[1]Weighted average.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System, August 1980.

Table 2.3-7. Percentage shares of crafts in total M-X construction labor, average wage rates by craft, regional wage rates, and weighted average wage rate for all M-X construction labor, Nevada/Utah and Texas/New Mexico.

Craft	Percent Share (Percent)	Nevada/Utah Wage Rate (1978 $/Hr)	Regional Wage Ratio (Percent)	Texas/New Mexico Wage Rate (1978 $/Hr)
Repair and Service[1]	4.89	16.26	88.3	14.36
Carpenters	3.06	14.19	81.2	11.52
Electricians	6.57	18.14	73.5	13.33
Ironworkers[2]	5.91	15.85	77.1	12.22
Millwrights[3]	0.68	14.20	81.2	11.53
Cement Masons	0.22	13.98	82.3	11.51
Operating Engineers	16.72	16.26	88.3	14.36
Painters	0.28	14.88	75.2	11.19
Pipefitters	0.52	16.38	80.8	13.24
Plasterers	0.00	13.98	82.5	11.53
Plumbers	0.32	16.30	76.8	12.52
Teamsters	6.12	12.48	88.3	11.02
Tilesetters	0.05	13.98	78.3	10.95
Laborers	13.48	10.79	81.1	8.75
Piledrivers	1.75	13.97	88.3	12.34
Camp & Kitchen Workers	15.14	7.67	88.3	6.77
Security	2.62	6.39	88.3	5.64
OH, Cler.,Prof., COE	21.66	9.33	88.3	8.24
Total or Average	100.00	12.20	84.5	10.33

T5325/9-29-81

[1]Wage rate for operating engineers is used.

[2]Regional wage ratio is average for reinforcing ironworkers and structural ironworkers.

[3]Regional wage ratio for carpenters is used.

Sources: Calculations by HDR Sciences based on data from U.S. Air Force, AFRCE/MX Task Force for Manpower Requirements, "Craft Study," Attachment 6, 19 March 1981; and R.M. Parsons and Co., M-X Verifiable Horizontal MPS Construction Concepts Investigation: Operational Construction Cost Estimate, January 1981, "Labor-Project Requirements."

Table 2.3-8. Average gross hourly earnings in construction, in current dollars, United States, August 1978 - September 1980.

Month and Year	Earnings Dollars
1978	
August	8.73
1979	
October	9.40
November	9.48
December	9.55
1980	
January	9.46
February	9.64
March	9.75
April	9.79
May	9.83
June	9.89
July	9.94
August	10.04
September	10.05
Fiscal Year 1980 Average[1]	9.74
Percent Change, August 1978-FY 1980	11.57

T5326/9-29-81

[1]Fiscal year 1980 is October 1979-September 1980.

Sources: Council of Economic Advisors, Economic Report of the President, January 1980, p. 244; and Economic Report of the President, January 1981, p. 274.

Table 2.3-9. Derivation of average annual earnings plus subsistence, construction labor for Nevada/Utah and Texas/New Mexico deployment regions.

Variable	Nevada/Utah	Texas/New Mexico
Straight-time Wage plus Selected Benefits (August 1978 Dollars/Hour)	$12.20	$10.33
Change in U.S. Construction Wage, August 1978 - FY 1980 (Percent)	11.57	11.57
Straight-time Wage plus Selected Benefits (FY 1980 Dollars/Hour)	$13.61	$11.53
Adjustment for Overtime Earnings (Percent)[1]	12.02	12.02
Composite Straight-time and Overtime Wage plus Benefits (FY 1980 Dollars/Hour)	$15.25	$12.92
Average Annual Hours	2,080	2,080
Average Annual Earnings (FY 1980 Dollars/Year)	$31,710	$26,870
Average Subsistence Pay Supplement (FY 1980 Dollars/Year)	$5,400	$5,400
Average Annual Earnings plus Subsistence	$37,110	$32,270

T5327/9-29-81

[1] Assumes 2,080 hours per year, worked in 20 weeks of 60 hours each and 32 weeks of 27.5 hours each. Gross pay for a 60-hour week, assuming 15 hours at time-and-a-half and 5 hours at double-time, would average in Nevada/Utah $13.61x40+ $13.61x1.5x15+$13.61x2.0x5 = $986.725 per week, or $19,734.50 over 20 weeks. Gross pay for the shorter work weeks would average $13.61x27.5 = $374.275 per week, or $11,976.80 over 32 weeks. Total gross pay therefore would average $19,734.50+$11,976.80 = $31,711.30 per year, or 12.02 percent over straight-time annual earnings of $28,308.80. This same percentage is also applied to Texas/New Mexico.

Source: HDR Sciences, based on sources cited in preceding tables.

Table 2.3-10. Employment and payrolls covered by Nevada Unemployment Insurance Law, January 1979 - September 1980 (Page 1 of 2).

Month and Year	Covered Employment (Jobs)	Covered Payrolls (Dollars)
1979		
January	358,156	
February	363,067	1,139,987,444
March	372,785	
April	372,115	
May	377,776	1,197,074,506
June	382,977	
July	384,849	
August	388,858	1,264,779,518
September	391,406	
October	393,559	
November	394,768	1,308,003,392
December	394,811	
1980		
January	384,642	
February	387,245	1,331,861,137
March	392,770	
April	392,404	
May	397,435	1,357,030,592
June	399,665	
July	399,275	
August	401,434	1,437,523,669
September	403,549	

T5328/9-29-81

Table 2.3-10. Employment and payrolls covered by Nevada Unemployment Insurance Law, January 1979 - September 1980 (Page 2 of 2).

Month and Year	Covered Employment (Jobs)	Covered Payrolls (Dollars)
1979 Annual		
Average or Total	381,261	4,909,844,860
Earnings/Worker	—	12,878
FY 1980 Annual		
Average or Total	395,130	5,434,418,790
Earnings/Worker	—	13,753
Percent Change, Earnings/Worker		6.8

T5328/9-29-81

[1]Quarterly total.

Sources: For 1979, Nevada Employment Security Department, Nevada Employment and Payrolls, 1979, pp. 1 and 7. For 1980, personal communication, Mr. Dan Colbert, Nevada ESD, 11 May 1981.

Table 2.3-11. Nonagricultural employment, payrolls, and earnings per worker in Utah, 1979-80.

Year	Nonagricultural Employment (Jobs)	Nonagricultural Payrolls (Thousand Dollars)	Earnings/Worker	
			Dollars	Percent Change
1979	548,420	6,605,121	12,044	--
1980	554,099	7,314,740	13,201	9.6
FY 1980[1]	552,679	7,137,335	12,914	7.2

T5329/9-29-81

[1]Because FY1980 consists of the last quarter of 1979 and the first three quarters of 1980, FY1980 average is calculated as weighted average of 1979 and 1980 annual data, with 1980 employment and payrolls receiving .75 weight and 1979 data assigned .25 weight.

Source: Utah Department of Employment Security, Employment Newsletter, March 1981.

Table 2.3-12. Employment and payrolls covered by Texas Unemployment Insurance Law, January 1979 - June 1980 (Page 1 of 2).

Month and Year	Covered Employment (Jobs)	Covered Payrolls (Dollars)
1979		
January	5,317,783	
February	5,354,867	16,863,648,071
March	5,416,964	
April	5,445,892	
May	5,486,655	17,450,253,828
June	5,526,988	
July	5,481,800	
August	5,498,250	18,049,468,601
September	5,560,357	
October	5,595,308	
November	5,624,695	19,532,255,081
December	5,647,697	
1980		
January	5,602,405	
February	5,624,767	19,785,406,077
March	5,670,063	
April	5,711,324	
May	5,745,491	20,226,071,875
June	5,765,716	
1979 Annual		
Average or Total	5,496,438	71,895,625,581
Earnings/Worker	—	13,080

T5330/9-29-81

Table 2.3-12. Employment and payrolls covered by Texas Unemployment Insurance Law, January 1979 - June 1980 (Page 2 of 2).

Month and Year	Covered Employment (Jobs)	Covered Payrolls (Dollars)
FY 1980 Annual[2]		
Average or Total	5,665,274	79,391,644,050
Earnings/Worker	—	14,014
Percent Change, Earnings/Worker	—	7.1

T5330/9-29-81

[1]Quarterly total.

[2]For employment, figure shown is nine-month average, October 1979 - June 1980. For payrolls, figure shown is 4/3 of the total after three quarters.

Source: Texas Employment Commission, Covered Employment and Wages, by Industry and County, selected issues.

Table 2.3-13. Employment and payrolls covered by New Mexico unemployment insurance law, First Quarter 1979-Second Quarter 1980.

Quarter and Year	Covered Employment (Number of Jobs)			Covered Payroll[1] (Thousands of Dollars)		
	Private	Government	Total	Private	Government	Total
1979						
First	321,130	105,898	427,028	894,753	330,839	1,225,592
Second	333,525	107,183	440,708	937,623	364,989	1,302,612
Third	340,291	96,955	437,246	984,136	311,964	1,296,100
Fourth	338,134	108,053	446,187	1,022,966	360,066	1,383,032
1980						
First	326,555	108,803	435,358	1,023,658	368,228	1,391,886
Second	331,890	111,625	443,515	1,043,714	398,122	1,441,836
1979 Annual						
Average or Total	-	-	437,792	-	-	5,207,336
Earnings/Worker	-	-	-	-	-	11,895
FY 1980 Annual[2]						
Average or Total	-	-	441,687	-	-	5,622,339
Earnings/Worker	-	-	-	-	-	12,729
Percent Change, Earnings/Worker	-	-	-	-	-	7.0

T5741/9-17-81

[1]Quarterly totals.

[2]For employment, figure shown is the average for three quarters; for payrolls, figure shown is 4/3 of the total after three quarters.

Source: New Mexico Employment Security Department, Covered Employment and Wages Quarterly Report, selected issues.

Table 2.3-14. Wage and salary employment plus proprietors, total labor and proprietors income by place of work, and earnings per worker, Nevada, Utah, Texas, and New Mexico, 1979-FY1980.

Variable	Nevada	Utah	Texas	New Mexico
1979				
Employment (Number of Jobs)	426,730	613,614	6,624,715	547,329
Earnings (Thousands of Dollars)	6,006,255	7,991,991	92,517,051	7,146,550
Earnings/Worker (Dollars)	14,075	13,024	13,965	13,057
FY 1980				
Earnings/Worker (Dollars)	15,032	13,962	14,957	13,971
Assumed Percent Change	6.8	7.2	7.1	7.0

T5742/9-17-81

Sources: For 1979, U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System, August 1980; for FY 1980, calculations by HDR Sciences. See preceding tables.

Table 2.3-15. FY 1980 earnings-per-worker by state and deployment region.

State and Region	FY 1980 Earnings/Worker
Nevada	$15,032
Utah	13,962
Nevada/Utah	14,497
Texas	14,957
New Mexico	13,971
Texas/New Mexico	14,464

T5743/9-17-81

Source: HDR Sciences, based on data from state employment security departments and U.S. Bureau of Economic Analysis.

The relative proportions of each of these 21 employment categories vary from year to year, but the general pattern is quite similar in all years. In estimating a weighted average wage for M-X construction employment for use in the regional analysis, an overall average proportionate distribution of workers across these occupational categories was used. Table 2.3-3 presents total work-year requirements for each of the crafts for the 1982-89 period. As the table indicates, of a total of almost 80,000 work-years required during the construction phase, only 48,000 are in construction crafts of various kinds. The remaining 31,500 work-years are in camp and kitchen employment, security employment, and overhead, clerical, professional, and Corps of Engineers employment. Detailed wage data for the track crew and "other craft" categories shown in Table 2.3-2 were not available. In order to include these two specialized craft categories in estimating the weighted average construction wage, the sum of the 1982-1989 totals, shown in the last column of Table 2.3-2 (i.e., 89.5 and 155.4 for track crew and "other craft" categories respectively) were distributed among the first 15 craft categories listed. The 244.9 man-years were distributed among the 15 craft categories based on their relative share of the subtotal man-year requirements of the 15 craft category total (e.g., see columns one and two of Table 2.3-3).

In military construction programming, it is standard to assume a 12 percent contingency in planning for manpower requirements (personal communication, W. Allen Nixon, USAF, Headquarters AFESC, September 1981). Contingency labor requirements were distributed over the occupational categories in proportion to their relative shares in the unadjusted total of about 79,500 work-years (Table 2.3-3). This adjustment resulted in a revised 1982-89 total cumulative work-year requirement of about 89,300 work-years. The proportionate distribution of total cumulative employment by occupation is shown in Table 2.3-3. Operating engineers represent 16.7 percent, and laborers, 13.5 percent of total cumulative construction labor requirements. Other craft shares are much lower. In total craft workers represent only 61 percent of all construction labor demands. Overhead, clerical, professional, and Corps of Engineers personnel constitute almost 22 percent of total labor requirements--the largest single employment category. Camp and kitchen personnel account for an additional 15.1 percent of total construction labor requirements over the 1982-89 period.

Total hours, total payroll, and average hourly wage rates by craft have been compiled and reported by Ralph M. Parsons, & Co., for DDA facilities, in M-X Verifiable Horizontal MPS Construction Concept Investigation: Operational Construction Cost Estimate, January 1981, "Labor Project Requirements" (Table 2.3-4). Hourly wage rates paid to construction workers are based on wages and employer contributions for selected benefits by craft, obtained from union business offices in the Las Vegas and Reno, Nevada, and Salt Lake City, Utah, areas in August 1978. The wage rates shown in Table 2.3-4, directly applicable only to the Nevada/Utah ROI, are weighted averages of rates for numerous subcraft categories with the weights in each category determined by the relative proportions of subcrafts in total DDA requirement for each craft. For example, operating engineers include many types of equipment operators and foremen, earning from $14.88 to $18.46 per hour (1978 dollars). The figure of $16.26 is a weighted average of these rates. Appendix E contains a more detailed disaggregation of the wage and hour data to the subcraft level. As a result, the hourly wage rate data shown in Table 2.3-4 include wage rate differentials paid for construction foremen as well as for craft helpers and apprentices.

In order to estimate Texas/New Mexico construction wages, data from the U.S. Department of Labor, Bureau of Labor Statistics (BLS) were used to estimate wage differentials between the Nevada/Utah region and the Texas/New Mexico region. (See U.S. Department of Labor, "Union Wages and Benefits: Building Trades," July 3, 1978, Washington, D.C.). Texas is in the Southwest Region as defined by BLS while New Mexico is in the Mountain Region for BLS data collection purposes. Table 2.3-5 presents average regional wages compiled by BLS for July 1978. The table also shows the Nevada/Utah wage data compiled by Ralph M. Parsons & Co. for Nevada/Utah in August 1978. Since the BLS data are for journeymen workers only, the Parson data presented in Table 2.3-5 are for journeymen workers only, without adjustments for foremen and craft assistants. Table 2.3-5 then presents relative wage ratios for the Southwest and Mountain Regions as an average, compared to the Nevada/Utah data compiled by R. M. Parsons & Co. Rates in Nevada/Utah exceed the Southwest-Mountain average by as much as 26.5 percent or $4.72 per hour for electricians. The smallest proportionate disparity between rates in the two regions is 17.5 percent for plasterers, or $2.45 per hour. For the 11 principal crafts reported in the BLS publications, the relative wage ratios (last column in Table 2.3-5) were multiplied by the corresponding hourly rates for the Nevada/Utah ROI (last column in Table 2.3-4). The results yield hourly wage rates assumed for the Texas/New Mexico ROI (Table 2.3-7).

Since data are available from the Bureau of Labor Statistics only for 11 principal construction crafts, data are required for wages plus employer contributions for selected benefits for operating engineers, teamsters, camp operations workers, and security personnel. In order to estimate regional wage disparities between Nevada/Utah and Texas/New Mexico for these remaining categories, wage and salary payments per worker in construction have been estimated for Nevada, Utah, Texas, and New Mexico for 1979 using data from the Regional Economic Information System of the U.S. Bureau of Economic Analysis. These data are presented in Table 2.3-6. Wage and salary payments per worker in construction are highest in Nevada, about $19,400 per year, and lowest in New Mexico, about $12,800 per year. The average for the Nevada/Utah region is approximately $16,900 per year while the Texas/New Mexico average is about $15,000 per year. Consequently, the ratio of Texas/New Mexico wages to Nevada/Utah construction wage payments is 88.3 percent (Table 2.3-6). This proportion is used to calculate regional wage differentials for those craft categories for which the BLS craft-specific data are not available (Table 2.3-7). These categories include repair and service workers, operating engineers, teamsters, pile drivers, camp and kitchen workers, security personnel, and overhead clerical, professional, and Corps of Engineers personnel.

In summary, the approach used in this analysis is to utilize the detailed wage rate data collected by Ralph M. Parsons & Co. for Nevada/Utah. These figures were then adjusted for the relative demands of the various subcraft categories as well as the demands for construction foremen, as the best available data on craft wages for those crafts required by M-X. Comparable Texas/New Mexico wages were estimated using relative wage ratios for specific crafts in each region. This approach has the advantage of incorporating the subcraft, foremen, and helper detail available in the Parsons data while still accounting for regional differences in construction wages.

Table 2.3-7 presents the Nevada/Utah wage rate data (1978 dollars), the percentage shares in cumulative employment work-year totals for each construction

craft, the regional wage ratios for these crafts, and the estimated Texas/New Mexico wage rate (1978 dollars). The percentage share figures of all craft categories (i.e., last column of Table 2.3-3) are used as weights to calculate weighted average regional wage rates for M-X construction labor. In Nevada/Utah the average M-X construction wage is $12.20 per hour (1978 dollars), and in Texas/New Mexico, $10.33 per hour, (1978 dollars), 84.5 percent of the Nevada/Utah figure. These data were adjusted to an FY 1980 dollar basis by using a time series on average gross hourly earnings in construction in the United States on a monthly basis from August 1978 through September 1980 (see Table 2.3-8). These data are collected by the U.S. Bureau of Labor Statistics and reported by the Council of Economic Advisors in the Economic Report of the President, January 1980 and January 1981. From August 1978--the date of collection of the Parsons wage rate data--to a fiscal year 1980 average, average gross hourly earnings in construction in the United States in current dollars increased from $8.73 per hour to $9.74 per hour. The latter figure of $9.74 is the 12-month average for October 1979 through September 1980--FY 1980. This change represents an 11.57 percent increase from August 1978 to FY 1980 as a whole.

Table 2.3-9 adjusts the Nevada/Utah and Texas/New Mexico regional construction wages specific to the M-X project to account for wage increases from August 1978 through FY 1980, to account for probable overtime earnings, to account for average annual subsistence payments, and to convert hourly earnings to an annual earnings basis. In Nevada/Utah, the average straight time wage plus selected benefits in August 1978 dollars per hour of $12.20 is equivalent to $13.61 in FY 1980 dollars per hour. To account for overtime earnings, this analysis assumes that each worker would work an average of 2,080 hours per year, in 20 weeks of 60 hours each and 32 weeks of 27.5 hours each. Gross pay for a 60 hour week, assuming 15 hours at time and a half, and 5 hours of double time, would average $986.73 per week, or $19,734.50 over 20 weeks in Nevada/Utah. Gross pay for the shorter work weeks would average $374.28 per week, or $11,976.80 for 32 weeks. Total gross pay, therefore, would average $31,710 per year or 12.02 percent above straight time annual earnings of $28,308.80 per year. This same percentage has also been applied to Texas and New Mexico. At an average subsistence pay supplement of $21 per work day, in FY 1980 dollars, an annual average subsistence pay supplement of $5,400 would accrue to each worker. Thus, the total average annual earnings plus subsistence for a Nevada/Utah construction worker would be $37,110.

In Texas/New Mexico the straight time wage plus selected benefits in August 1978 dollars per hour of $10.33 has been increased to $11.53 after adjustment to FY 1980 dollars per hour. The composite straight time and overtime wage plus benefits would amount to $12.92 per hour. For a 2,080 hour work year, average annual earnings in FY 1980 dollars would amount to $26,870. Assuming the same average subsistence pay supplement as in Nevada/Utah, average annual earnings plus subsistence in Texas/New Mexico would amount to about $32,270.

Indirect Worker Earnings

Data are available through 1979 for earnings and employment for each of the four states from the Regional Economic Information System of the U.S. Bureau of Economic Analysis. These data have been updated to an FY 1980 dollar basis using wage information available from state sources. Tables 2.3-10 through 2.3-13 present the data used for each state to update state-wide average earnings to an FY 1980 basis.

In Nevada, the data have been obtained from the state's Employment Security Department, and relate to employment and payrolls covered by the Nevada unemployment insurance law for January 1979 through September 1980 (Table 2.3-10). In 1979, annual average earnings per worker amounted to $12,878. For FY 1980, annual average earnings per worker were $13,753. This represents a 6.8 percent increase from the 1979 annual average to the annual average for the fiscal year ending in September 1980.

In Utah, available data relate to non-agricultural employment and payrolls for 1979 and 1980, and have been obtained from the Utah Department of Employment Security (Table 2.3-11). FY 1980 payrolls per worker were 7.2 percent higher than the 1979 annual average. The FY 1980 figure was calculated as a weighted average of 1979 and 1980 annual data, with 1980 employment and payrolls receiving a .75 weight, and 1979 data assigned a .25 weight.

In Texas, covered employment and payrolls for 1979 and the first six months of 1980 are presented in Table 2.3-12. The source of these data is the Texas Employment Commission. The 1979 annual average earnings per worker equalled $13,080. FY 1980 annual average earnings per worker, $14,014, were 7.1 percent higher than the 1979 annual level. For Texas, since only the first six months of 1980 were available at the time this analysis was performed, FY 1980 employment has been estimated as the nine-month average of October 1979 through June 1980. For payrolls, FY 1980 total has been estimated as four-thirds of the total after the first three quarters of FY 1980.

Table 2.3-13 summarizes employment and payroll data covered by New Mexico unemployment insurance law for 1979 and the first two quarters of 1980. The 1979 annual average earnings per worker for covered employment was $11,695. For FY 1980, based on estimates for the first three quarters, average annual earnings per worker increased to $12,729, 7.0 percent above the 1979 annual average level.

Table 2.3-14 updates 1979 earnings per worker data for these four states to FY 1980 dollars using the percentage changes calculated for state wages from employment security agencies.

Table 2.3-15 calculates regional average earnings per worker for FY 1980 for Nevada/Utah and Texas/New Mexico. In Nevada/Utah the regional average wage is estimated at $14,497 per year. In Texas/New Mexico the regional average earnings figure is $14,464 per year. These data are used to estimate indirect employment on the basis of projected indirect earnings resulting from M-X activity in the deployment regions (see Section 3.0).

INCOME TRANSFERS (2.3.2)

Federal Income Tax Rates

The income tax rates used in this analysis are progressive, and reflect the general structure of federal income taxes. All tax rates shown are effective rates, and make allowances for deductions and exemptions. Construction workers, with incomes above $30,000 annually, are assumed to pay 22 percent of their gross incomes in taxes. Assembly and checkout workers, officers, and civilian operations personnel, with annual incomes in the range of $19,700 to $25,800, are all assumed

to pay 17 percent of their gross incomes in federal income taxes. Enlisted personnel, with significantly lower incomes ($11,400 per year) are assumed to pay 10 percent of their gross incomes in federal income taxes.

Table 2.3-18 displays representative federal income tax calculations for each category of direct M-X employment. The table displays representative exemptions and deductions for workers in each employment category, by marital status. For construction workers, a married worker is assumed to have $6,000 per year in personal exemptions and deductions in excess of the standard deduction of $3,400 per year. The married construction worker's family size (see Section 4 of this report) is assumed to average 3.6 persons, so that, at the current exemption rate of $1,000 per person, $3,600 would be exempt from federal income tax. In addition, many workers in this income bracket would have itemized deductions in excess of the standard deduction of $3,400 per year, so a figure of $6,000 has been used in this analysis --$3,600 for personal exemptions and an additional $2,400 for itemized deductions for the typical married construction worker. This would imply a taxable income of $28,690 per year ($34,690 as an average for both Nevada/Utah and Texas/New Mexico minus $6,000 in exemptions and deductions). Using the 1980 tax rate schedules, this would imply a tax liability of $5,814 per year, and would represent 16.8 percent of the married construction worker's gross earnings (see U.S. Internal Revenue Service, Tax Rate Schedules X and Y for 1980, from 1040, and schedule TC).

For a single construction worker, exemptions and deductions are assumed to equal $2,000, considerably less than those for a married worker. This would consist of $1,000 in personal exemptions and an additional $1,000 representing average itemized deductions in excess of the standard deduction. Consequently, taxable income would amount to $32,690, implying a tax liability of $9,146 per year, or 26.4 percent of the single worker's gross earnings.

An average federal income tax rate of 22.0 percent has been used for construction workers as a whole. This rate is the simple average of married and single construction worker tax rates. This analysis was based on 1980 tax rates, and hence was prior to the recent enactment of federal legislation reducing federal income tax rates. Reduced tax rates would result in a larger percentage of workers' earnings available for spending in the deployment regions and elsewhere. Thus, M-X employment and income impacts would be slightly larger with the tax cut than without it.

Assembly and checkout workers, officers, and civilian operations workers with average gross incomes of $23,500 are assumed to have exemptions and deductions of $4,000 if married and $1,250 if single. For married workers with average family sizes of 3.4 to 3.6 persons per household (see Section 4), the $4,000 figure represents a personal exemption of $3,600 for the average household plus $400 in itemized deductions in excess of the standard deduction. The single worker with $1,250 dollars in exemptions and deductions would have a $1,000 personal exemption and an average of $250 for itemized deductions in excess of the personal deduction. This would imply a tax liability of $3,105 for the married worker, and $4,942 for the single worker. This represents an average effective tax rate of 13.2 percent for the married worker and 21.0 percent for the single worker. All workers in this group are assumed to pay 17.0 percent of their gross earnings in federal taxes, the simple average of married and single worker rates.

Enlisted personnel, earning $11,400 per year in FY 1980 dollars, are assumed to pay 6.0 percent of their gross incomes in federal taxes if they are married, and 12.9 percent of their gross incomes in federal income taxes if they are single. A composite figure of 10.0 percent is assumed for this analysis.

State Income Tax Rates

The Utah and New Mexico state income tax rates shown in Tables 2.3-16 and 2.3-17 are derived using calculations and assumptions similar to those for federal income tax rates. All rates shown are effective average tax rates, making allowance for representative deductions and exemptions. As with federal tax rates, the state income tax rates in New Mexico and Utah are progressive, reflecting the general structure of state income taxes. The Utah state income tax would amount to 6.0 percent of gross income for the more highly paid construction workers, and 5.4 percent of gross income for the lower-paid assembly and checkout and civilian operations personnel. The state income tax rates paid by military personnel--2.0 percent--represent averages for states where military personnel claim residence, not for the state of Utah. In New Mexico, the effective state income tax rates are substantially lower than in Utah--2.8 percent for the construction workers and 1.9 percent for assembly and checkout and operations workers. The same tax rate assumption of 2.0 percent for officers and enlisted personnel is applied in New Mexico as in Utah. This same percentage applies to military personnel in Texas and Nevada as well, though neither state has a state income tax.

Personal Savings Rates

Construction workers are assumed to have an average rate of personal saving of 7.0 percent of gross earnings. Assembly and checkout workers, officers, and civilian operations personnel are assumed to save 5.0 percent of their gross annual earnings. Enlisted personnel are assumed to save 3.0 percent of their earnings.

These savings rate assumptions are consistent with aggregate U.S. individual saving behavior. In 1980, personal saving in the United States amounted to 4.8 percent of total personal income. Personal saving as a percentage of total personal income declined from about 7.0 percent in 1970 to the range of 4.4-4.8 percent during 1977-80 (See Council of Economic Advisors, Economic Report of the President, Washington, D.C., January 1981, p. 258).

Earnings per worker for most M-X employees would be significantly higher than average U.S. earnings per worker. In 1979, earnings per worker for all wage and salary and proprietary workers in the United States averaged $14,081 dollars (see ETR-2A). In FY 1980 dollars, this figure would be $14,991 (calculated using the percentage change in the implicit price deflator for gross national product from 1979 through FY 1980 -- a percent change of 6.46 percent. See Council of Economic Advisors, January 1981, p. 236). Since personal savings rates tend to increase with income, personal saving as a percent of gross earnings for most M-X employees would be higher than personal savings as a percentage of income for U.S. workers as a whole. The higher the earnings above the U.S. average, the higher the rate of personal savings above the U.S. average. Construction workers, with incomes in excess of $30,000 per year, consequently are assumed to save much more than the recent U.S. average of 4.4-4.8 percent of income--7.0 percent of their gross annual

Table 2.3-16. Tax, savings, and income transfer assumptions for Texas/New Mexico deployment region (percent).

Employment Type	Federal Income Tax Rate	N. Mex. State Income Tax Rate[1]	Personal Savings Rate	Social Security Tax Rate	Federal Retirement Contribution	Earnings Spent Outside Region
Construction Workers	22.0	2.8	7.0	6.0	—	8.0
Assembly and Checkout Workers	17.0	1.9	5.0	6.0	—	8.0
Officers	17.0	2.0	5.0	6.0	—	25.0
Enlisted Personnel	10.0	2.0	3.0	6.0	—	30.0
Civilian Operations Personnel	17.0	1.9	5.0	—	7.0	13.0

T2972/9-29-81

Note: All tax rates shown are effective rates, and include allowances for deductions and exemptions.

[1]Rates shown for officers and enlisted personnel represent averages for states where military personnel claim residence.

Source: HDR Sciences, 1981, based on information from U.S. Air Force and other federal and state agencies. See text and Tables 2.3-18 and 2.3-19.

Table 2.3-17. Tax, savings, and income transfer assumptions for Texas/New Mexico deployment region (percent).

Employment Type	Federal Income Tax Rate	N. Mex. State Income Tax Rate[1]	Personal Savings Rate	Social Security Tax Rate	Federal Retirement Contribution	Earnings Spent Outside Region
Construction Workers	22.0	2.8	7.0	6.0	—	8.0
Assembly and Checkout Workers	17.0	1.9	5.0	6.0	—	8.0
Officers	17.0	2.0	5.0	6.0	—	25.0
Enlisted Personnel	10.0	2.0	3.0	6.0	—	30.0
Civilian Operations Personnel	17.0	1.9	5.0	—	7.0	13.0

T2972/9-29-81

Note: All tax rates shown are effective rates, and include allowances for deductions and exemptions.

[1]Rates shown for officers and enlisted personnel represent averages for states where military personnel claim residence.

Source: HDR Sciences, 1981, based on information from U.S. Air Force and other federal and state agencies. See text and Tables 2.3-18 and 2.3-19.

Table 2.3-18. Representative federal income tax calculations for direct M-X employees.

Item	Construction	A&CO, Officers, Civilian Operations	Enlisted
Average gross earnings[1] ($/yr)	34,690	23,500	11,400
Exemptions, deductions			
Married ($/yr)	6,000	4,000	3,500
Single ($/yr)	2,000	1,250	1,000
Tax payments			
Married ($/yr)	5,814	3,105	684
Single ($/yr)	9,146	4,942	1,471
Average tax rate			
Married (percent)	16.8	13.2	6.0
Single (percent)	26.4	21.0	12.9
Composite tax rate (percent)	22.0	17.0	10.0

T6043/10-2-81

[1]Earnings are averages for the employment types shown.

Sources: For earnings, U.S. Air Force, U.S. Bureau of Economic Analysis, and U.S. Bureau of Labor Statistics (see preceding tables). For tax information, U.S. Internal Revenue Service, Washington, D.C., tax rate schedules X (single taxpayers) and Y (married taxpayers) for 1980, form 1040, and schedule TC.

earnings. Assembly and checkout workers, officers, and civilian operations personnel, with incomes above the U.S. average, but lower than construction workers, are assumed to save about 5.0 percent of their gross annual earnings. Enlisted personnel, with incomes below the U.S. average, are assumed to save 3.0 percent of their gross earnings.

Social Security Tax Rates

All direct M-X employees would be subject to payment of social security payroll taxes with the exception of federal civilian employees. These persons are assumed to contribute to the federal retirement fund. As a simplification, for all persons paying social security taxes, 6.0 percent of gross earnings are assumed to be paid in social security payroll taxes. This figure is applied to all of gross earnings, while the social security tax actually applies only to earnings up to the wage base. In 1980, workers were required to pay 6.13 percent of their gross earnings up to $25,900 per year in social security taxes. In 1981 the tax rate was raised to 6.65 percent of gross earnings up to $29,700 per year. In 1982, the social security tax rate is scheduled to be raised to 6.70 percent, while the wage base is indexed to increases in the average wage. In 1983 and 1984, social security taxes are scheduled at 6.70 percent of gross earnings up to the indexed wage base. In 1985, the social security tax rate would be raised to 7.05 percent, and in 1986 to 7.15 percent. Social security tax rate would remain constant at this level through 1989, and in 1990 would be raised to 7.65 percent. The wage base would increase each year according to increases in the average wage level.

At the 1981 tax rate and wage base--the only year for which the actual wage base is known--a payroll tax of 6.65 percent on the first $29,700 of gross earnings is equivalent to 5.3 percent of gross earnings for Nevada/Utah construction workers with projected incomes of $37,110 per year, and 6.1 percent of Texas/New Mexico construction workers with projected incomes of $32,270 per year. The figure of 6.0 percent is used as an average for this category. Other direct M-X employees are assumed to pay the same 6.0 percent payroll taxes for social security. Actual tax rates probably would be slightly higher--6.70-7.65 percent. However, the bias introduced by the projected changes in social security taxes would have a very small effect on personal consumption expenditures.

Federal Retirement Contributions

Only federal civilian operations personnel would contribute to the federal retirement fund. The contribution rate is 7.0 percent of gross earnings. Federal civilian operations personnel would not be subject to social security taxes since these workers currently are not covered by the social security system.

Earnings Spent Outside Region

In addition to income and payroll tax payments, retirement contributions, and personal savings, a fraction of the earnings of direct M-X employees is assumed to be spent outside the ROI or at various base facilities, such as the base exchange. Earnings spent at onbase facilities are assumed not to enter the local economy. These earnings, consequently, would not have a multiplier effect on local economic activity. Civilian M-X employees in Nevada/Utah are assumed to spend 15.0 percent of their earnings outside the ROI. Officers are assumed to spend 25.0 percent of their earnings either at the onbase facilities or outside the ROI,

while enlisted personnel are assumed to spend 30.0 percent of their earnings at onbase facilities or outside the ROI.

These assumptions are based on data for U.S. Air Force installations surveyed in 1978 to determine average consumption expenditure patterns of Air Force personnel. Table 2.3-19 displays some of the results of this survey which would apply to M-X. For a typical U.S.A.F. installation included in the survey, DOD civilians were found to make 88 percent of their personal consumption expenditures within the region, and the other 12 percent outside the region. Offbase personnel make 59 percent of their consumption expenditures in the region, and 41 percent of their expenditures onbase or outside the region. Onbase personnel were found to make 51 percent of their consumer purchases in the region, and 49 percent of their purchases onbase or outside the region. In this analysis, figures for construction, A&CO, and civilian operations workers are assumed to be the same as those for DOD civilians in the 1978 survey.

These spending patterns are based on total personal consumption expenditures, rather than total earnings. Personal consumption expenditures are equivalent to earnings after taxes and after savings. Based on the tax and saving assumptions presented in Tables 2.3-16 and 2.3-17, the proportion of gross earnings, rather than consumption, spent outside the region also has been estimated, and is presented in Table 2.3-19. For example, civilians are likely to make 12.0 percent of their personal consumption expenditures outside the region. If personal consumption expenditures amount to 59.0-65.0 percent of gross income, then the percent of gross income spent outside the region would be 7.1-7.8 percent. The estimates of personal consumption expenditures as a percent of gross income are presented as a range, based on differences in the state income taxes in Nevada, Utah, Texas and New Mexico. The lower end of the range presented in Table 2.3-19 is for Utah, since it has the highest state income tax of any of the four states considered. The upper end of the range is for Nevada or Texas, which have no state income tax. Thus, for Utah, an assumption of 12.0 percent of personal consumption expenditures outside the region, when personal consumption expenditures represent 59.0 percent of gross income, is equivalent to 7.1 percent of gross income spent outside the region. The tax liabilities and saving behavior of construction, assembly and checkout, and civilian operations workers differ somewhat, so even though regional consumption behavior is assumed to be the same for these three groups, the fraction of gross earnings spent outside the region varies slightly among the civilian M-X employees. For the three categories of civilian M-X employees, the percent of gross income spent outside the region, using the U.S.A.F. average consumption behavior patterns, ranges from 7.1 to 8.5 percent.

For military personnel, officers are assumed to have consumption expenditures closest to the offbase category in the 1978 U.S.A.F. survey, while enlisted personnel are assumed to have consumption patterns closest to the onbase average in the 1978 survey. As a consequence, officers would make 59.0 percent of their personal consumption expenditures in the region, and 41.0 percent outside the region. Since personal consumption expenditures represent 70.0 percent of gross earnings for officers as a group, a total of 28.7 percent of gross income would be spent outside the region on the basis of the U.S.A.F. average consumption patterns. For enlisted personnel, a total of 51.0 percent of their personal consumption expenditures would be made in the region, while 49.0 percent would be made outside the region. Since personal consumption expenditures represent 79.0 percent of gross earnings for

Table 2.3-19. Projected earnings shares spent outside ROI, U.S. Air Force averages and M-X assumptions, by employment type.

Item	Construction	A&CO	Officers	Enlisted	Civilian Operations
U.S. Air Force Average					
Percent of personal construction expenditures in region[1]	88.0	88.0	59.0	51.0	88.0
Percent of personal construction expenditures outside region[1]	12.0	12.0	41.0	49.0	12.0
Personal construction expenditures as percent of gross earnings[2]	59.0-65.0	66.6-72.0	70.0	79.0	65.6-71.0
Percent of gross earnings spent outside region[2]	7.1-7.8	8.0-8.6	28.7	32.3	7.9-8.5
M-X					
Percent of earnings spent outside region[3]					
Nevada/Utah	13.0	13.0	25.0	30.0	13.0
Texas/New Mexico	8.0	8.0	25.0	30.0	13.0

T6044/10-2-81

[1]Construction, A&CO, and civilian operations personnel data are based on survey results for DOD civilians. Data for officers and enlisted personnel are offbase and onbase averages, respectively.

[2]Ranges are based on differences in state income tax rates for Nevada, Utah, Texas, and New Mexico. Upper end of range is Nevada or Texas figure, lower end of range is Utah figure, since Utah has highest state income tax rate of the four states.

[3]Civilian figures have been adjusted upward from U.S. Air Force averages to reflect relatively sparse nature of ROI economies. Because of preliminary state of base planning and consequent uncertainty about extent of base services, military figures have been adjusted downward to assess "high-impact" case on local economies.

Source: For U.S. Air Force average consumption expenditure patterns, U.S. Air Force, Headquarters Air Force Engineering and Services Center, Tyndall AFB, Florida, based on a survey of Air Force installations in 1978.

Note: Expenditures at installation facilities are considered to be outside ROI, and are treated as procurement. See Section 2.5.

enlisted personnel, the percent of gross earnings spent outside the region--on the basis of U.S.A.F. average behavior--would be 32.3 percent.

These estimates of gross earnings spent outside the region, while derived using tax rates specific to the four states under consideration as M-X sites, nevertheless are based on U.S.A.F. average consumption patterns. To the extent that the potential M-X deployment regions would be different from the regions surrounding other U.S.A.F. installations, the U.S.A.F. average expenditure patterns should be adjusted. In addition, to the extent that services provided on the M-X operating bases differ from the average for the surveyed U.S.A.F. installations, the percentages of earnings spent outside the region should be adjusted. The last two lines in Table 2.3-19 present the assumptions used in this analysis regarding the percent of earnings spent outside the region for each M-X employment type. The civilian worker categories have been adjusted upward--especially in Nevada/Utah--to account for the relatively sparse nature of the ROI economy compared to the rest of the United States. Because of uncertainty about the range of services to be provided onbase, the assumed percentage of income spent outside the region for military personnel has been lowered slightly from the U.S.A.F. average. This has the effect of estimating a "high-impact" case on the local economies around the bases.

Because the Texas/New Mexico region is somewhat more accessible from major population centers than is Nevada/Utah, construction and assembly and checkout worker earnings would probably be spent over a broader area in Texas/New Mexico than in Nevada/Utah. Much of this income would be spent outside the ROI, and has been accounted for by distributing the project's effects on consumption final demand over a larger region in Texas/New Mexico than in Nevada/Utah (see Section 2.4). The percentages of earnings spent outside the region by construction and A&CO workers in Texas/New Mexico consequently are smaller than they are for the Nevada/Utah region.

2.4 REGIONAL DISTRIBUTION OF PAYROLL CONSUMPTION EXPENDITURES

Consumption expenditures associated with M-X project payrolls would be of two major types: expenditures originating with camp payrolls, and expenditures attributable to base payrolls. Although these payrolls would be earned at well-defined points of project activity, the consumption expenditures resulting from these payroll earnings would be spread over a much broader area. The distribution of these expenditures within the deployment regions has been estimated based on two critical factors. First, the greater the population of a given community or county within the ROI, the more likely that it will be able to provide the goods and services demanded by project workers. Consequently, the level of expenditures in a given community associated with project activity at various points in the ROI would be expected to vary directly with the population of that community. Second, the greater the distance between a community and points of project activity--construction camps or bases--the smaller the fraction of project payroll consumption expenditures likely to be spent in that community. Distance implies travel and information costs. As these costs rise, the attractiveness of any particular community as a place where project workers would spend their incomes is likely to decline.

CONSTRUCTION CAMP PAYROLLS

Both of these factors have been taken into consideration in estimating the regional distribution of consumption expenditures originating at M-X construction camps and operating base sites. For construction camps, a two-step procedure has been followed. First, a significant fraction of total consumption expenditures within the region has been judgementally allocated to the counties closest to the construction camps. For this portion of expenditures, the regional distribution across counties is the same as the allocation of employment by place of residence, discussed in Section 4 of this report. The purpose of this purely local share of consumption expenditures is to ensure consistency among assumptions about the distribution of expenditures and the places of residence of project employees. The second portion of construction camp payroll expenditures has been allocated throughout the region using a gravity model formulation based on population and distance squared. This portion of expenditures reflects the fact that persons may live in one area and shop for selected items at a relatively great distance from where they live. This would be particularly true in communities with little developed economies such as many of those within the ROI.

In this analysis, 45 percent of consumption expenditures attributable to payrolls earned at construction camps are reserved for the areas closest to the camps. This 45 percent share is based on three specific assumptions. The share of expenditures likely to be spent in the areas closest to the construction camps would vary significantly depending upon the marital and family status of the construction and assembly and checkout workers. As indicated in Section 4 of this report, it is assumed that 50 percent of the construction workers would be married and bring their families. For this 50 percent expenditures have been distributed such that 75 percent would be spent in the local area, and the remaining 25 percent in the region as a whole. Even though this 25 percent would be distributed around the region, some of these regional expenditures would, nevertheless, be assigned to the local areas because of their relative attractiveness due to their short distances from the construction camps.

About 25 percent of the construction workers are assumed to be single. For this group of workers, is assumed that 25 percent of consumption expenditures would be purely local, and the remaining 75 percent would be spent around the region.

The final 25 percent of construction workers are assumed to be married but are assumed not to bring their families with them to jobs in the local areas. Since it is possible that these families would take up residence in major cities in the ROI--such as Las Vegas, Salt Lake City, Amarillo, Lubbock or Clovis--10 percent of expenditures for this group are reserved for the local areas and the remaining 90 percent are assumed to be spent throughout the region. This relatively high fraction allows for greater expenditures in the metropolitan areas where many of these dependents may be located.

Using the proportionate distribution of construction workers by marital and family status as weights, these assumptions specific to each marital and family type represent in the aggregate a purely local expenditure share of 46.25 percent. The remaining 53.75 percent would be spent throughout the ROI. As a simplification, 45 percent of consumption expenditures are assumed local, while 55 percent are assumed to be spent throughout the region, some of which would go to the local

areas as well, and the balance of which would flow to those counties and communities in the region with the greatest attractiveness.

As indicated previously, the 45 percent share of purely local expenditures has been allocated among the counties closest to the construction camps on the basis of where the construction and assembly and checkout workers are assumed to reside. For example, 90 percent of the workers employed in a construction camp in Lincoln County are assumed to live in Lincoln County, while the remaining 10 percent live in Clark County but commute to work in Lincoln. Nine-tenths of the 45 percent local share for that construction camps payroll expenditures are assigned to Lincoln County. The remaining one-tenth of the 45 percent share of local expenditures would be assigned to Clark County.

Tables 2.4-1 and 2.4-2 present county shares in construction camp payroll consumption expenditures based on these resident allocations for Nevada/Utah and Texas/New Mexico respectively. The column totals in these tables sum to 45 percent of total consumption expenditures made within the ROI. The individual row entries in each column indicate for any given camp the percentage distribution of local consumption expenditures associated with that camp. For example, for Camp No. 1 located in Lincoln County, Nevada, nine-tenths of the workers employed in Camp 1 are assumed to live in Lincoln County. As a result, 40.50 percent of the local consumption expenditures associated with that camp have been allocated to Lincoln County. The remaining 4.50 percent of the local consumption expenditures associated with that camp have been assigned to Clark County. The same distribution is assumed for Camp No. 2 as for Camp No. 1 since both are located in Lincoln County. While this equality is unlikely since the camps are in different locations, the employment-residence allocations presented in Section 4 are specific only at the county level, not at the level of the individual camp. These employment-residence allocation assumptions consequently have been applied equally to each of the camps in a given county. Varying this assumption may change the results of the analysis slightly, though aggregate variation is not likely to be great because differences in percentages associated with one camp would be offset by countervailing differences in percentages associated with another camp. For example, since Camp No. 1 is closer to Clark County than is Camp No. 2, the share of local consumption expenditures going to Clark County probably would be greater than 4.5 percent. On the other hand, the share of local consumption expenditures going into Clark County from Camp No. 2 probably would be less than 4.50 percent. Thus, a possible bias for any one camp in a county would be offset by an opposite bias for other camps in that county.

The remaining 55 percent of personal consumption expenditures originating with construction and assembly and checkout workers employed in camps are assumed to be distributed around the ROI according to a gravity model formulation using population in the numerator and distance squared in the denominator. The population and distance data for communities in and near the Nevada/Utah ROI are shown in Tables 2.4-3 and 2.4-4. Population data are taken from the 1980 census, while the distance data have been read from U.S. geological survey maps of Nevada and Utah at a scale of 1:500,000. Tables 2.4-5 and 2.4-6 present population and distance data for communities in and near the Texas/New Mexico ROI.

The attractiveness coefficients derived using a gravity model based on these distance and population data--scaled downward by a factor of .55 to adjust for local

Table 2.4-1. County Shares in construction camp payroll expenditures based on residence allocation, Nevada/Utah (percent)

COUNTY	CONSTRUCTION CAMP NUMBER																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Clark	4.50	4.50																
Salt Lake/ Utah							2.25	2.25										
Millard				38.25	38.25	38.25	13.50	13.50										
Beaver			36.00	4.50	4.50	4.50												
Iron			4.50															
Lincoln	40.50	40.50	4.50						2.25	2.25	2.25	2.25	2.25	2.25	42.75	42.75	2.25	2.25
White Pine									2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	42.75	42.75
Eureka																		
Nye									40.50	40.50	40.50	40.50	40.50	40.50				
Juab				2.25	2.25	2.25	29.25	29.25										
Total	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00

Source: Employment-residence allocations presented in Section 4.

Table 2.4-2. County shares in construction camp payroll expenditures based on residence allocation, Texas/New Mexico (percent)

COUNTY	CONSTRUCTION CAMP NUMBER														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Dallam											6.75	2.25	31.50	31.50	31.50
Hartley											29.25	2.25	4.50	4.50	4.50
Sherman													4.50	4.50	4.50
Moore											4.50		2.25	2.25	2.25
Potter/Randall						4.50	4.50	11.25	15.75	15.75	4.50				
Deaf Smith						2.25	2.25	4.50	27.00	27.00					
Swisher								2.25							
Parmer			2.25			27.00	27.00								
Bailey			27.00			2.25	2.25								
Lamb			4.50			2.25	2.25								
Lubbock			2.25												
Hale								2.25							
Hockley			2.25												
Cochran		2.25		2.25											
Oldham									2.25	2.25					
Castro						2.25	2.25	24.75							
Quay					31.50							11.25			
Curry		6.75	4.50	6.75	6.75	4.50	4.50								
DeBaca		2.25		2.25	2.25										
Roosevelt		31.50	2.25	31.50	4.50										
Chaves	45.00	2.25		2.25											
Union													2.25	2.25	2.25
Harding												29.25			
Total	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00

Source: Employment-residence allocations presented in Section 4.

Table 2.4-3.

POPULATION OF SELECTED COMMUNITIES IN NEVADA AND UTAH, 1980

COMMUNITY	POPULATION
LAS VEGAS, NV	445541
RENO, NV	135771
SALT LAKE CITY, UT	587189
LYNNDYL, UT	501
DELTA, UT	1930
FILLMORE, UT	2072
MILFORD, UT	1292
BERYL, UT	751
CEDAR CITY, UT	10947
CALIENTE, NV	1040
ELY, NV	7617
DUCKWATER, NV	20
EUREKA, NV	780
AUSTIN, NV	442
TONOPAH, NV	2673
PROVO, UT	127508
EUREKA, UT	668
NEPHI, UT	3271
ST. GEORGE, UT	18678
GOLDFIELD, NV	300
BEAVER, UT	1797

SOURCE: U.S. BUREAU OF THE CENSUS, 1980. CT

Table 2.4-4.

DISTANCES BETWEEN CONSTRUCTION CAMPS AND SELECTED COMMUNITIES, NEVADA/UTAH FULL DEPLOYMENT (MILES)

COMMUNITY \ CAMP NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
LAS VEGAS, NV	128	196	252	295	287	310	366	368	148	163	209	209	211	263	324	360	364	390
RENO, NV	407	399	439	427	387	449	465	467	341	301	295	258	237	351	296	274	274	204
SALT LAKE CITY, UT	308	320	254	190	208	150	142	120	376	434	334	424	459	356	338	362	378	406
LYNNDYL, UT	244	176	123	74	88	42	70	63	258	290	240	280	315	212	194	218	234	262
DELTA, UT	228	160	107	58	72	26	54	47	242	274	224	264	299	196	178	202	218	246
FILLMORE, UT	194	210	124	76	102	40	70	63	258	286	240	280	315	212	194	218	234	262
MILFORD, UT	118	134	48	44	88	66	122	115	186	283	222	294	297	194	176	200	216	244
BERYL, UT	70	86	96	92	136	114	170	163	138	235	281	278	301	226	208	232	248	276
CEDAR CITY, UT	96	114	116	112	156	134	190	207	166	181	227	224	248	256	238	262	278	306
CALIENTE NV	14	54	152	148	174	214	254	264	82	97	143	140	164	194	176	200	216	244
ELY, NEV	159	80	116	116	68	108	148	158	108	140	90	130	165	62	44	68	84	112
DUCKWATER, NV	223	144	180	180	132	172	212	222	44	76	26	66	99	9	108	132	148	176
EUREKA, NV	217	138	174	174	126	166	206	216	166	198	148	189	142	120	57	32	34	36
AUSTIN, NV	268	227	263	263	215	255	295	305	212	209	174	149	117	209	122	102	102	32
TONOPAH, NV	152	343	379	379	331	371	411	421	104	69	63	26	3	117	215	192	192	118
PROVO, UT	253	174	210	210	172	106	134	127	322	354	304	344	379	276	258	282	298	326
EUREKA, UT	217	138	174	174	126	70	98	91	286	318	268	308	343	240	222	246	262	290
NEPHI, UT	274	206	153	104	118	72	100	93	288	320	270	310	345	242	224	248	264	292
ST GEORGE, UT	110	126	156	157	196	174	230	223	178	193	239	236	260	268	250	274	290	318
GOLDFIELD, NV	178	369	405	405	357	397	437	447	128	95	89	52	29	143	241	218	218	144
BEAVER, UT	142	158	72	68	112	90	146	129	210	307	246	318	321	218	200	234	250	268

SOURCE HDR SCIENCES, FROM USGS MAPS OF STATES AT 1 500,000 SCALE 25-AUG-81

CT

Table 2.4-3.

POPULATION OF SELECTED COMMUNITIES IN OKLAHOMA, TEXAS, AND NEW MEXICO, 1980

COMMUNITY	POPULATION
BOISE CITY, OK	1993
GUYMON, OK	7674
DALHART, TX	6871
STRATFORD, TX	1923
DUMAS, TX	12157
LOGAN, NM	747
TUCUMCARI, NM	6774
SANTA ROSA, NM	2477
VAUGHN, NM	738
AMARILLO, TX	173550
CANYON, TX	10708
HEREFORD, TX	15819
TULIA, TX	5037
CLOVIS, NM	31344
FT SUMNER, NM	1485
FARWELL, TX	1343
MULESHOE, TX	4828
PORTALES, NM	9927
ROSWELL, NM	39698
DEXTER, NM	882
CARLSBAD, NM	25592
LITTLEFIELD, TX	7317
OLTON, TX	2281
EARTH, TX	1497
LUBBOCK TX	219478
ABERNATHY, TX	2903
SLATON, TX	6776
WOLFFORTH, TX	1718
SHALLOWATER, TX	1954
LOCKNEY, TX	2350
FLOYDADA, TX	4232
PLAINVIEW, TX	22098
HALE CENTER, TX	2256
PETERSBURG, TX	1641
TAHOKA, TX	3265
BROWNFIELD, TX	10465
PLAINS, TX	1461
LEVELLAND, TX	13885
MORTON, TX	3976
SANTA FE, NM	48963
ALBUQUERQUE, NM	328837
EL PASO, TX	425122
OKLAHOMA CITY, OK	766000
DALLAS/FT WORTH, TX	1284228
CLAYTON, NM	2981
ARTESIA, NM	10430
TATUM, NM	897
LOVINGTON, NM	9766
HOBBS, NM	29194
HAGERMAN, NM	931
VEGA, TX	901
DIMMITT, TX	5001
SUNRAY, TX	1955
FRIONA, TX	3801
BOVINA, TX	1525

SOURCE U S BUREAU OF THE CENSUS, 1980 CT

Table 2.4-6.

DISTANCES BETWEEN CONSTRUCTION CAMPS AND SELECTED COMMUNITIES, TEXAS/NEW MEXICO FULL DEPLOYMENT (MILES)

COMMUNITY \ CAMP NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
BOISE CITY, OK	324	245	250	251	203	227	199	212	172	145	96	142	82	79	49
GUYMON, OK	328	247	246	256	212	198	201	214	174	147	98	151	94	81	51
DALHART, TX	263	182	182	186	142	128	131	139	104	77	28	81	24	21	19
STRATFORD, TX	287	206	205	215	171	157	160	173	133	106	57	110	53	40	10
DUMAS, TX	269	188	182	198	179	138	131	139	114	87	66	119	62	59	44
LOGAN, NM	194	119	133	121	73	120	118	149	88	87	38	20	80	90	88
TUCUMCARI, NM	196	121	138	123	75	122	120	151	90	89	62	44	104	114	112
SANTA ROSA, NM	161	141	155	111	113	145	140	202	147	146	119	101	161	171	169
VAUGHN, NM	131	154	168	124	126	155	153	215	188	187	160	142	202	212	210
AMARILLO, TX	221	140	134	150	142	80	83	91	77	50	114	131	110	107	92
CANYON, TX	205	132	118	134	136	64	67	75	93	64	130	147	126	120	108
HEREFORD, TX	174	101	87	103	105	33	36	44	40	33	123	125	119	116	114
TULIA, TX	214	151	98	154	156	84	47	55	91	56	164	176	160	154	142
CLOVIS, NM	117	42	56	44	46	43	41	103	99	92	115	97	157	167	165
FT. SUMNER, NM	119	99	113	69	71	100	98	160	156	149	161	154	203	212	211
FARWELL, TX	129	54	44	56	58	31	39	91	87	80	127	109	166	163	161
MULESHOE, TX	138	75	22	78	80	53	61	69	103	98	149	131	188	181	179
PORTALES, NM	98	26	72	34	65	62	60	122	118	111	134	116	176	186	184
ROSWELL, NM	36	108	164	106	154	154	152	214	210	203	226	208	268	278	276
DEXTER, NM	55	127	173	125	173	173	171	233	229	222	245	227	287	297	295
CARLSBAD, NM	116	163	193	186	234	234	232	269	290	283	306	288	348	358	356
LITTLEFIELD, TX	146	108	53	109	111	84	92	100	134	129	180	162	219	212	210
OLTON, TX	172	118	56	112	114	87	49	77	93	86	176	178	172	169	167
EARTH, TX	156	93	40	96	98	71	43	51	84	80	165	149	166	163	161
LUBBOCK, TX	134	113	84	145	147	120	117	127	161	128	216	198	232	226	214
ABERNATHY, TX	152	131	102	163	165	138	99	109	143	110	249	216	214	208	196
SLATON, TX	147	128	99	160	162	135	132	142	176	148	231	213	247	241	229
WOLFFORTH, TX	123	124	95	156	158	131	128	138	172	139	247	209	243	237	225
SHALLOWATER, TX	145	124	78	134	136	109	117	125	159	139	205	187	244	237	225
LOCKNEY, TX	195	157	95	151	153	126	88	98	144	99	207	219	203	197	185
FLOYDADA, TX	207	169	107	163	165	138	100	110	132	111	219	231	215	209	197
PLAINVIEW, TX	179	141	79	135	137	110	72	82	116	83	191	201	187	181	169
HALE CENTER, TX	169	151	89	145	147	120	82	92	126	93	201	211	197	191	179
PETERSBURG, TX	166	146	100	178	156	131	93	103	137	104	212	222	208	202	190
TAHOKA, TX	125	129	112	177	179	152	149	159	193	160	248	230	264	258	246
BROWNFIELD, TX	96	100	83	151	165	138	146	154	188	166	234	216	273	266	252
PLAINS, TX	64	68	67	128	159	127	135	143	177	172	215	205	262	255	253
LEVELLAND, TX	121	83	54	122	136	109	117	125	159	154	205	187	244	237	235
MORTON, TX	103	57	28	96	115	88	96	104	138	133	184	166	223	216	214
SANTA FE, NM	229	253	265	223	225	257	252	314	259	258	231	213	273	283	281
ALBUQUERQUE, NM	231	255	272	225	227	259	254	316	261	260	233	215	275	285	283
EL PASO, TX	279	326	356	349	397	397	395	432	453	446	383	365	425	435	433
OKLAHOMA CITY, OK	478	397	391	407	399	337	340	348	334	307	371	388	367	364	349
DALLAS/FT WORTH, TX	465	446	417	478	480	433	450	460	494	461	549	531	565	559	547
CLAYTON, NM	284	205	223	211	163	187	173	181	146	119	74	102	42	67	65
ARTESIA, NM	80	127	169	150	198	198	196	245	254	247	270	252	312	322	320
TATUM, NM	34	38	97	98	129	126	124	173	182	175	198	180	240	250	248
LOVINGTON, NM	56	60	102	120	151	148	146	178	204	197	220	202	262	272	270
HOBBS, NM	78	82	124	142	173	170	168	200	226	219	242	224	284	294	292
HAGERMAN, NM	61	133	167	131	179	179	177	239	235	228	251	233	293	303	301
VEGA, TX	205	124	118	134	105	64	67	75	40	13	92	94	88	85	83
DIMMITT, TX	183	120	67	123	125	53	16	24	60	53	143	145	139	136	134
SUNRAY, TX	290	209	203	220	200	159	152	160	135	108	87	133	83	73	43
FRIONA, TX	160	87	77	89	80	19	36	58	54	47	137	139	133	130	128
BOVINA, TX	142	67	57	69	71	18	16	78	74	67	157	122	153	150	148

SOURCE HDR SCIENCES, FROM USGS MAPS OF STATES AT 1:500,000 SCALE 25-AUG-81 CT

expenditures--are presented in Table 2.4-7 for the Nevada/Utah ROI. Table 2.4-8 presents analogous data for the Texas/New Mexico ROI. Data are presented in this section for all of the camps. Split deployment camps would be in the same locations as those for full deployment though fewer camps would be needed. Thus, the coefficients for the full deployment configuration also are used for split deployment. Figures 2.1-1 through 2.1-4 illustrate the correspondence between construction camps for full and split deployment in each of the potential deployment regions.

Table 2.4-9 and 2.4-10 present composite data on community shares in construction camp payroll expenditures for Nevada/Utah and Texas/New Mexico. The coefficients presented in each of these two tables are the sum of the local coefficients and the regional gravity model coefficients presented earlier. The community shares presented in Tables 2.4-9 and 2.4-10 determine the regional distribution of consumption expenditures associated with each of the camps. The actual level of expenditures originating in a given camp would be determined by the number of employees in that camp in any given year, the wages earned by those employees (as discussed previously in this section), and income transfers or leakages out of the region (also as discussed previously in this section). The columns in Tables 2.4-9 and 2.4-10 sum to 100 percent, indicating that all consumption expenditures made within the set of counties and communities included in these tables represent the sum total of regional consumption expenditures. However, several communities included in these tables are not within the formally defined ROI. For example, in Table 2.4-9, the second row indicates personal consumption expenditure shares asigned to Reno, Nevada, in Washoe County. While these shares range up to 13.5 percent (for camp 18), the resulting expenditures are relatively small compared to the size of the Washoe County economy. As a consequence, indirect employment is likely to occur in Washoe County, though the amount of indirect employment and income earned would be relatively small compared to the county's baseline employment at that time. In Table 2.4-10, a number of cities outside the ROI but still within a reasonably short travel distance have been included in the analysis. These cities include Oklahoma City, El Paso, Dallas/Ft. Worth, Santa Fe, and Albuquerque. As with Reno, significant dollar expenditures would occur in these cities. However, given the size of these metropolitan area economies, indirect employment and income effects resulting from M-X would be relatively small.

BASE PAYROLLS

Tables 2.4-11 and 2.4-12 display the subregional allocation matrices used in association with payrolls earned at the base locations. These allocation assumptions apply to construction, assembly and checkout, and operations earnings at the base sites. These matrices are based on informed judgement, taking into account both distance to and attractive potential of communities near the possible base sites.

For Coyote Spring, Nevada, 95 percent of base payroll expenditures are assumed to go to Clark County. The remaining 5 percent of base payroll consumption expenditures would be made in Lincoln County.

For the Milford OB location, 55 percent of base payroll consumption expenditures are assumed to stay in Beaver County, while 35 percent of expenditures are projected to be made in Iron County. Salt Lake/Utah and Clark counties are projected to receive 5 percent of expenditures each.

Table 2.4-7. Gravity-model allocations of regional expenditures, 55 percent of total, full deployment in Nevada/Utah (percent).

Community	Construction Camp Number																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Clark Co., Nevada																		
Las Vegas	28.19	23.57	16.41	9.42	10.54	5.05	4.25	3.24	37.97	37.38	26.07	25.53	1.75	20.71	12.06	12.97	13.99	12.10
Washoe Co., Nevada																		
Reno	0.85	1.73	1.65	1.37	1.77	0.73	0.80	0.61	2.18	3.34	4.09	5.11	0.42	3.54	4.73	6.82	7.52	13.47
Salt Lake Co., Utah																		
Salt Lake City	6.42	11.65	21.29	29.94	26.46	28.41	37.21	40.18	7.75	6.59	13.78	8.18	0.49	14.87	15.70	16.1	17.09	14.71
Provo	2.07	8.56	6.76	5.32	8.40	12.35	9.07	7.79	2.23	2.27	3.61	2.70	0.16	5.38	5.85	6.05	5.97	4.95
Millard Co., Utah																		
Lynndyl	0.01	0.03	0.08	0.17	0.13	0.31	0.13	0.12	0.01	0.01	0.02	0.02	0.00	0.04	0.04	0.04	0.04	0.03
Delta	0.04	0.15	0.39	1.06	0.73	3.11	0.85	0.26	0.06	0.06	0.10	0.07	0.00	0.16	0.19	0.18	0.17	0.13
Fillmore	0.06	0.10	0.32	0.66	0.39	1.41	0.54	0.51	0.06	0.06	0.07	0.07	0.00	0.15	0.17	0.16	0.16	0.13
Beaver Co., Utah																		
Milford	0.19	0.29	2.12	0.88	0.00	0.56	0.22	0.20	0.15	0.08	0.15	0.08	0.01	0.23	0.26	0.25	0.12	0.19
Iron Co., Utah																		
Beryl	0.16	0.21	0.19	0.16	0.06	0.06	0.03	0.03	0.07	0.03	0.03	0.02	0.00	0.05	0.05	0.05	0.05	0.04
Cedar City	1.23	1.71	1.90	1.61	0.88	0.66	0.39	0.25	0.74	0.75	0.56	0.55	0.03	0.54	0.59	0.60	0.59	0.48
Lincoln Co., Nevada																		
Caliente	13.68	1.80	0.26	0.22	0.17	0.06	0.05	0.04	0.718	0.61	0.33	0.33	0.02	0.22	0.26	0.24	0.23	0.18
White Pine Co., Nevada																		
Ely	0.31	2.42	1.32	1.04	3.21	0.71	0.44	0.30	1.22	0.87	2.46	1.13	0.05	6.37	12.02	6.21	4.49	0.51
Eureka Co., Nevada																		
Eureka	0.02	0.08	0.06	0.05	0.10	0.03	0.02	0.02	0.05	0.04	0.09	0.06	0.01	0.17	0.73	2.87	2.81	2.49
Lander Co., Nevada																		
Austin	0.01	0.02	0.02	0.01	0.02	0.01	0.01	0.01	0.02	0.02	0.04	0.05	0.01	0.03	0.09	0.16	0.18	1.78
Nye Co., Nevada																		
Tonopah	0.12	0.05	0.05	0.75	0.05	0.02	0.02	0.02	0.48	1.26	1.84	9.91	51.94	1.32	0.18	0.28	0.42	0.80
Juab Co., Utah																		
Eureka	0.02	0.07	0.05	0.04	0.08	0.13	0.09	0.08	0.02	0.02	0.02	0.02	0.00	0.04	0.04	2.87	0.04	0.03
Nephi	2.05	0.16	0.33	0.56	0.46	0.69	0.42	0.37	0.07	0.07	0.12	0.09	0.04	0.18	0.20	0.20	0.20	0.16
Washington Co., Utah																		
St. George	1.06	2.39	1.80	1.40	0.45	0.67	0.45	0.37	1.10	1.12	0.86	0.84	0.05	0.84	0.91	0.94	0.92	0.76

T5953/10-2-81

Source: HDR Sciences. See text and preceding tables.

Table 2.4-8. Community shares in construction camp payroll expenditures (percent): full deployment in Texas/New Mexico (Page 1 of 3).

Community	Construction Camp Number														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Oklahoma Co., Okla.															
Oklahoma City	2.91	2.49	2.31	3.07	3.64	2.73	2.44	3.75	4.31	2.93	4.78	4.93	4.96	4.21	3.39
Cimarron Co., Okla.															
Boise City	0.01	0.02	0.02	0.02	0.02	0.04	0.02	0.03	0.04	0.03	0.19	0.10	0.26	0.26	0.45
Texas Co., Okla.															
Guyman	0.04	0.07	0.06	0.09	0.13	0.08	0.07	0.10	0.16	0.13	0.69	0.33	0.76	0.95	1.59
Dallam Co., Texas															
Dalhart	0.03	0.05	0.05	0.07	0.13	0.09	0.07	0.11	0.20	0.21	3.76	0.51	5.20	6.34	5.13
Hartley Co., Texas															
Dalhart/Hartley	0.03	0.05	0.05	0.07	0.13	0.09	0.07	0.11	0.20	0.21	3.76	0.51	5.20	6.34	5.13
Sherman Co., Texas															
Stratford	0.11	0.20	0.17	0.23	0.32	0.29	0.29	0.418	0.654	0.49	2.62	0.94	3.01	3.14	4.00
Moore Co., Texas															
Dumas	0.11	0.20	0.17	0.23	0.32	0.29	0.29	0.418	0.654	0.59	2.62	0.94	3.01	3.14	4.00
Sunray															
Potter/Randall Cos., Texas															
Amarillo	2.13	4.54	4.46	5.12	6.52	10.99	9.26	12.31	18.35	25.04	11.46	9.80	12.51	12.34	11.05
Canyon	0.15	0.32	0.36	0.40	0.44	1.06	0.88	1.13	0.78	0.94	0.54	0.48	0.60	0.61	0.50
Deaf Smith Co., Texas															
Hereford	0.31	0.80	0.96	0.99	1.07	5.89	4.49	4.84	6.20	5.24	0.90	0.98	0.97	1.00	0.66
Swisher Co., Texas															
Tulia	0.07	0.11	0.24	0.14	0.16	0.29	0.84	0.99	0.38	0.58	0.16	0.16	0.17	0.17	0.14
Parmer Co., Texas															
Farwell	0.18	0.67	0.83	0.81	0.98	6.74	3.59	0.913	1.10	0.82	0.30	0.40	0.29	0.28	0.19
Friona															
Bovina															
Bailey Co., Texas															
Muleshoe	0.15	0.44	4.60	0.53	0.57	0.70	0.48	0.60	0.29	0.18	0.19	0.27	0.12	0.12	0.08
Lamb Co., Texas															
Littlefield	0.21	0.32	1.20	0.41	0.45	0.42	0.32	0.43	0.26	0.16	0.19	0.27	0.13	0.13	0.09
Olton	0.05	0.09	0.34	0.12	0.13	0.12	0.35	0.23	0.17	0.11	0.06	0.07	0.07	0.07	0.04
Earth	0.04	0.07	0.43	0.11	0.12	0.12	0.30	0.34	0.13	0.08	0.05	0.07	0.05	0.05	0.03

I595/19-2-81

Table 2.4-8. Community shares in construction camp payroll expenditures (percent): full deployment in Texas/New Mexico (Page 2 of 3).

Community	Construction Camp Number														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Lubbock Co., Texas															
Lubbock	7.31	8.82	14.34	6.92	7.67	6.18	5.89	8.06	5.31	4.83	4.04	5.43	3.56	3.50	2.58
Slaton	0.19	0.21	0.32	0.18	0.20	0.15	0.14	0.20	0.14	0.11	0.11	0.15	0.10	0.10	0.07
Wolfforth	0.07	0.06	0.09	0.05	0.05	0.04	0.04	0.05	0.04	0.03	0.02	0.04	0.03	0.03	0.02
Shallowater	0.06	0.07	0.15	0.07	0.08	0.07	0.05	0.07	0.05	0.04	0.04	0.05	0.03	0.03	0.02
Hale Co., Texas															
Abernathy	0.08	0.09	0.13	0.07	0.08	0.06	0.11	0.15	0.09	0.09	0.04	0.06	0.06	0.06	0.04
Plainview	0.41	0.57	1.63	0.80	0.81	0.74	1.57	1.95	1.03	1.16	0.52	0.53	0.55	0.55	0.42
Hale Center	0.05	0.05	0.13	0.07	0.08	0.06	0.12	0.16	0.09	0.09	0.05	0.05	0.05	0.04	
Floyd Co., Texas															
Lockney	0.04	0.05	0.12	0.07	0.08	0.06	0.11	0.15	0.07	0.09	0.05	0.05	0.05	0.05	0.04
Floydada	0.06	0.08	0.17	0.11	0.12	0.09	0.16	0.21	0.15	0.12	0.08	0.08	0.08	0.08	0.06
Petersburg	0.04	0.04	1.63	0.03	0.05	0.04	0.04	0.07	0.09	0.06	0.06	0.06	0.03	0.03	0.03
Lynn Co., Texas															
Tahoka	0.13	0.10	0.12	0.07	0.08	0.06	0.05	0.08	0.06	0.05	0.05	0.06	0.04	0.04	0.03
Terry Co., Texas															
Brownfield	0.68	0.54	0.70	0.30	0.29	0.22	0.18	0.26	0.19	0.14	0.16	0.22	0.12	0.12	0.09
Hoakum Co., Texas															
Plains	0.21	0.16	0.15	0.06	0.04	0.04	0.03	0.04	0.03	0.02	0.03	0.03	0.02	0.02	0.01
Hockley Co., Texas															
Levelland	0.57	1.03	2.20	0.62	0.57	0.47	0.37	0.53	0.34	0.21	0.28	0.39	0.20	0.20	0.14
Cochran Co., Texas															
Morton	0.22	0.63	2.34	0.29	0.23	0.21	0.16	0.22	0.13	0.08	0.10	0.14	0.07	0.07	0.05
El Paso Co., Texas															
El Paso	3.27	2.05	1.55	2.31	2.04	1.09	1.09	1.35	1.30	0.77	2.49	3.09	2.05	1.83	1.22
Tarrant Co., Texas															
Dallas/Fort Worth	3.55	3.31	3.41	3.73	4.22	2.78	2.33	3.60	3.30	2.18	3.66	4.42	3.51	3.35	2.31
Oldham Co., Texas															
Vega	0.01	0.03	0.03	0.03	0.06	0.09	0.07	0.10	0.35	1.92	0.09	0.10	0.10	0.10	0.07
Castro Co., Texas															
Dimmitt	0.09	0.18	0.51	0.22	0.24	0.72	7.18	5.14	0.87	0.64	0.21	0.23	0.23	0.22	0.15

T5954/19-2-81

											11	12	13	14	15
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.44	1.81	0.10	0.08	0.05
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.51	3.39	0.55	0.42	0.29
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.15	0.24	0.08	0.07	0.05
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.01	0.03	0.04	0.02	0.01
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.36	2.93	3.23	1.11	0.92	0.62
[illegible] Co., New Mexico															
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.02	0.05	0.06	0.03	0.03	0.02
Roosevelt Co., New Mexico															
Portales	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.45	0.29	0.47	0.72	0.28	0.23	0.16
Chaves Co., New Mexico															
Roswell	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.51	0.36	0.35	0.67	0.89	0.48	0.42	0.28
Hagerman	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01
Dexter	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01
Eddy Co., New Mexico															
Carlsbad	1.14	0.49	0.32	[illegible]	[illegible]	0.19	0.18	0.21	0.19	0.12	0.24	0.30	0.18	0.16	0.11
Artesia	0.97	0.33	0.17	0.31	[illegible]	0.11	0.15	0.19	0.10	0.06	0.12	0.16	0.09	0.08	0.06
Santa Fe Co., New Mexico															
Santa Fe	0.56	0.39	0.32	0.65	[illegible]	0.30	0.28	0.27	0.46	0.27	0.79	1.05	0.57	0.50	0.33
Bernalillo Co., New Mexico															
Albuquerque	3.69	2.67	2.05	4.31	5.83	1.99	1.82	1.95	3.03	1.76	5.25	6.90	3.79	3.30	2.21
Lea Co., New Mexico															
Tatum	0.46	0.32	0.04	0.06	0.04	0.02	0.02	0.02	0.02	0.01	0.02	0.03	0.01	0.01	0.01
Lovington	1.86	1.39	0.43	0.45	0.32	0.18	0.17	0.18	0.15	0.09	0.17	0.23	0.12	0.11	0.02
Hobbs	2.87	2.23	0.88	0.96	0.74	0.41	0.04	0.05	0.09	0.08	0.47	0.28	1.47	0.54	0.38
Union Co., New Mexico															
Clayton	0.02	0.04	0.03	0.04	0.09	0.04	0.06	0.05	0.09	0.08	0.47	0.28	1.42	0.54	0.38
Harding Co., New Mexico	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

T5994/10-2-81

Source: HDR Sciences. See text and preceding tables.

Table 2.4-9. COMMUNITY SHARES IN CONSTRUCTION CAMP PAYROLL EXPENDITURES: Nevada/Utah Full Deployment

(PERCENT)

COMMUNITY	CONSTRUCTION CAMP NUMBER																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
CLARK CO , NEV (LAS VEGAS)	32 69	28 07	16 41	9 42	10 54	5 05	4 25	3 24	37 97	37 38	26 70	25 53	1 75	20 71	12 96	12 97	13 99	12 10
WASHOE CO , NEV (RENO)	0 85	1 73	1 65	1 37	1 77	0 73	0 80	0 61	2 18	3 34	4 09	5 11	0 42	3 54	4 73	6 82	7 52	13 47
SALT LAKE CO , UT																		
SALT LAKE CITY	6 42	11 65	21 29	29 94	26 46	28 41	39 02	42 06	7 75	6 59	13 78	8 18	0 49	14 89	15 70	16 90	17 09	14 71
PROVO	2 07	8 56	6 76	5 32	8 40	12 35	9 51	8 16	2 23	2 27	3 61	2 70	0 16	5 38	5 85	6 05	5 97	4 95
MILLARD CO , UT																		
LYNNDYL	0 01	0 03	0 08	3 61	4 11	2 76	1 28	1 21	0 01	0 01	0 02	0 02	0 00	0 04	0 04	0 04	0 04	0 03
DELTA	0 04	0 15	0 39	22 51	23 07	27 74	8 40	8 65	0 06	0 06	0 10	0 07	0 00	0 16	0 19	0 18	0 17	0 13
FILLMORE	0 06	0 10	0 32	14 02	12 32	12 58	5 34	5 13	0 06	0 06	0 09	0 07	0 00	0 15	0 17	0 16	0 16	0 13
BEAVER CO , UT (MILFORD)	0 19	0 29	38 12	5 38	5 10	5 06	0 22	0 20	0 15	0 08	0 15	0 08	0 01	0 23	0 26	0 25	0 12	0 19
IRON CO , UT																		
BERYL	0 16	0 21	0 60	0 16	0 08	0 06	0 03	0 03	0 07	0 03	0 03	0 02	0 00	0 05	0 05	0 05	0 05	0 04
CEDAR CITY	1 23	1 71	5 99	1 61	0 88	0 66	0 39	0 25	0 74	0 75	0 56	0 55	0 03	0 54	0 59	0 60	0 59	0 48
LINCOLN CO , NEV (CALIENTE)	54 18	42 30	4 76	0 22	0 17	0 06	0 05	0 04	2 97	2 86	2 58	2 58	2 27	2 47	0 26	0 24	0 23	0 18
WHITE PINE CO , NEV (ELY)	0 31	2 42	1 32	1 04	3 21	0 71	0 44	0 30	3 47	3 12	4 71	3 38	2 30	8 62	54 77	48 96	6 74	2 76
EUREKA CO , NEV (EUREKA)	0 02	0 08	0 06	0 05	0 10	0 03	0 02	0 02	0 05	0 04	0 09	0 06	0 01	0 17	2 98	5 12	45 56	45 24
LANDER CO , NEV (AUSTIN)	0 01	0 02	0 02	0 01	0 02	0 01	0 01	0 01	0 02	0 02	0 04	0 05	0 01	0 03	0 09	0 16	0 18	1 78
NYE CO , NEV (TONOPAH)	0 12	0 05	0 05	0 75	0 05	0 02	0 02	0 02	40 98	41 76	42 34	50 41	92 44	41 82	0 18	0 28	0 42	0 80
JUAB CO , UT																		
EUREKA	0 02	0 07	0 05	0 19	0 41	0 55	5 25	5 28	0 02	0 02	0 02	0 02	0 00	0 04	0 04	2 87	0 04	0 03
NEPHI	0 05	0 16	0 33	2 66	2 38	2 54	24 51	24 42	0 07	0 07	0 12	0 09	0 01	0 18	0 20	0 20	0 20	0 16
WASHINGTON CO , UT (ST GEORGE)	1 06	2 39	1 80	1 40	0 95	0 67	0 45	0 37	1 10	1 12	0 86	0 84	0 05	0 84	0 91	0 94	0 92	0 76

Source: HDR Sciences. See text and preceding tables.

Table 2.4-10. (Page 1 of 3)

COMMUNITY SHARES IN CONSTRUCTION CAMP PAYROLL EXPENDITURES
ALTERNATIVE 8
(PERCENT)

COMMUNITY	CONSTRUCTION CAMP NUMBER														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
OKLAHOMA															
OKLAHOMA CO (OKLAHOMA CITY)	2 010	2 490	2 310	3 070	3 640	2 730	2 440	3 750	4 310	2 930	4 780	4 930	4 960	4 710	3 390
CIMARRAN CO (BOISE CITY)	0 010	0 020	0 020	0 020	0 040	0 020	0 020	0 030	0 040	0 030	0 190	0 100	0 260	0 260	0 450
TEXAS CO (GUYMAN)	0 040	0 070	0 060	0 080	0 130	0 080	0 070	0 100	0 160	0 130	0 690	0 330	0 760	0 950	1 590
TEXAS															
DALLAM CO (DALHART)	0 045	0 075	0 075	0 105	0 195	0 068	0 105	0 165	0 300	0 315	32 640	4 140	34 800	36 510	34 695
HARTLEY CO (DALHART/HARTLEY)	0 015	0 025	0 025	0 035	0 065	0 023	0 035	0 055	0 100	0 105	10 880	1 380	11 600	12 170	11 565
SHERMAN CO (STRATFORD)	0 010	0 020	0 020	0 030	0 050	0 030	0 030	0 040	0 070	0 060	0 510	0 150	5 100	5 500	14 870
MOORE CO (DUMAS)	0 110	0 200	0 190	0 230	0 320	0 290	0 290	0 420	0 650	0 590	7 120	0 940	5 260	5 390	6 250
POTTER/RANDALL CO S															
AMARILLO	2 130	4 540	4 460	5 120	6 520	15 090	13 370	22 720	33 460	40 220	15 760	9 800	12 510	12 340	11 050
CANYON	0 150	0 320	0 360	0 400	0 440	1 460	1 270	2 070	1 420	1 510	0 740	0 480	0 600	0 610	0 500
DEAF SMITH CO (HEREFORD)	0 310	0 800	0 960	0 990	1 090	8 140	6 740	9 340	33 200	32 240	0 900	0 980	0 970	1 000	0 660
SWISHER CO (TULIA)	0 070	0 110	0 240	0 140	0 160	0 290	0 840	3 240	0 380	0 580	0 160	0 160	0 170	0 170	0 140
PARMER CO (FARWELL)	0 180	0 670	3 080	0 810	0 980	33 740	30 590	0 910	1 100	0 820	0 300	0 400	0 290	0 280	0 190
BAILEY CO (MULESHOE)	0 150	0 440	31 600	0 530	0 570	2 950	2 730	0 600	0 290	0 180	0 190	0 270	0 120	0 120	0 080
LAMB CO															
LITTLEFIELD	0 210	0 320	1 200	0 410	0 450	1 850	1 060	0 430	0 240	0 160	0 190	0 270	0 130	0 130	0 090
OLTON	0 050	0 080	0 340	0 120	0 130	0 530	1 160	0 230	0 170	0 110	0 060	0 070	0 070	0 070	0 040
EARTH	0 040	0 090	0 430	0 110	0 120	0 530	1 000	0 340	0 130	0 080	0 050	0 070	0 050	0 050	0 030

Table 2.4-10. (Page 2 of 3)

COMMUNITY SHARES IN CONSTRUCTION CAMP PAYROLL EXPENDITURES
ALTERNATIVE 8
(PERCENT)

COMMUNITY	CONSTRUCTION CAMP NUMBER														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
TEXAS															
LUBBOCK CO															
LUBBOCK	7.310	8.820	16.510	6.920	7.670	6.180	5.890	8.060	5.310	4.830	4.040	5.430	3.560	3.500	2.580
SLATON	0.190	0.210	0.370	0.180	0.200	0.150	0.140	0.200	0.140	0.110	0.110	0.150	0.100	0.100	0.070
WOLFFORTH	0.070	0.060	0.100	0.050	0.050	0.040	0.040	0.050	0.040	0.030	0.020	0.040	0.030	0.030	0.020
SHALLOWATER	0.060	0.070	0.170	0.070	0.080	0.070	0.050	0.070	0.050	0.040	0.040	0.050	0.030	0.030	0.020
HALE CO															
ABERNATHY	0.080	0.090	0.130	0.070	0.080	0.060	0.110	0.300	0.090	0.090	0.040	0.060	0.060	0.060	0.040
PLAINVIEW	0.410	0.570	1.630	0.800	0.810	0.740	1.570	3.890	1.030	1.160	0.520	0.530	0.550	0.550	0.420
HALE CENTER	0.050	0.050	0.130	0.070	0.080	0.060	0.120	0.320	0.090	0.050	0.050	0.050	0.050	0.050	0.040
FLOYD CO															
LOCKNEY	0.040	0.050	0.120	0.070	0.080	0.060	0.110	0.150	0.070	0.090	0.050	0.050	0.050	0.050	0.040
FLOYDADA	0.060	0.080	0.170	0.110	0.120	0.090	0.160	0.210	0.150	0.120	0.080	0.080	0.080	0.080	0.060
PETERSBURG	0.040	0.040	1.630	0.030	0.050	0.040	0.070	0.090	0.060	0.060	0.060	0.030	0.030	0.030	0.030
LYNN CO (TAHOKA)	0.130	0.100	0.120	0.070	0.080	0.060	0.050	0.080	0.060	0.050	0.050	0.060	0.040	0.040	0.030
TERRY CO (BROWNFIELD)	0.680	0.540	0.700	0.300	0.290	0.220	0.180	0.260	0.190	0.140	0.160	0.220	0.120	0.120	0.090
YOAKUM CO (PLAINS)	0.210	0.160	0.150	0.060	0.040	0.040	0.030	0.040	0.030	0.020	0.030	0.030	0.020	0.020	0.010
HOCKLEY CO (LEVELLAND)	0.570	1.030	2.200	0.620	0.570	0.470	0.370	0.530	0.340	0.210	0.280	0.390	0.200	0.200	0.140
COCHRAN CO (MORTON)	0.220	2.880	2.340	2.540	0.230	0.210	0.160	0.220	0.130	0.080	0.100	0.140	0.070	0.070	0.050
EL PASO CO (EL PASO)	3.270	2.050	1.550	2.310	2.040	1.090	1.000	1.350	1.300	0.770	2.490	3.090	2.050	1.830	1.220
TARRANT (DALLAS/FT WORTH)	3.550	3.310	3.410	3.730	4.220	2.780	2.330	3.600	3.300	2.180	3.660	4.420	3.510	3.350	2.310
OLDHAM CO (VEGA)	0.010	0.030	0.030	0.030	0.060	0.090	0.070	0.100	2.600	4.170	0.090	0.100	0.100	0.100	0.070
CASTRO CO (DIMMITT)	0.090	0.160	0.510	0.220	0.240	2.970	9.430	29.890	0.870	0.640	0.210	0.230	0.230	0.220	0.150

Table 2.4-10. (Page 3 of 3)

COMMUNITY SHARES IN CONSTRUCTION CAMP PAYROLL EXPENDITURES
ALTERNATIVE 8
(PERCENT)

COMMUNITY	CONSTRUCTION CAMP NUMBER														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
NEW MEXICO															
QUAY CO															
LOGAN	0.010	0.030	0.020	0.030	3.510	0.020	0.020	0.180	0.060	0.040	0.440	5.730	0.100	0.080	0.050
TUCUMCARI	0.110	0.240	0.160	0.300	29.010	0.180	0.170	0.040	0.520	0.310	1.510	10.720	0.550	0.420	0.290
GUADALUPE CO															
SANTA ROSA	0.060	0.060	0.050	0.130	0.150	0.050	0.050	0.040	0.070	0.040	0.150	0.240	0.080	0.070	0.050
VAUGHN	0.030	0.020	0.010	0.030	0.040	0.010	0.010	0.010	0.010	0.010	0.030	0.040	0.020	0.010	0.010
CURRY CO (CLOVIS)	1.370	15.870	9.110	17.490	17.960	11.370	11.350	1.750	2.010	1.340	2.030	3.230	1.110	0.920	0.620
DEBACA CO (FT SUMNER)	0.060	2.330	0.050	2.460	2.470	0.060	0.060	0.030	0.040	0.020	0.050	0.060	0.030	0.030	0.020
ROOSEVELT CO (PORTALES)	0.620	39.040	3.130	37.190	6.280	1.050	1.010	0.400	0.450	0.290	0.470	0.720	0.280	0.230	0.160
CHAVES CO															
ROSWELL	62.550	3.930	0.680	4.520	1.270	0.680	0.630	0.510	0.560	0.350	0.670	0.890	0.480	0.420	0.280
HAGERMAN	0.510	0.070	0.020	0.080	0.020	0.010	0.010	0.010	0.010	0.010	0.010	0.020	0.010	0.010	0.010
DEXTER	0.580	0.070	0.010	0.080	0.020	0.010	0.010	0.010	0.010	0.010	0.010	0.020	0.010	0.010	0.010
EDDY CO															
CARLSBAD	1.140	0.490	0.320	0.490	0.350	0.190	0.180	0.210	0.190	0.120	0.240	0.300	0.180	0.160	0.110
ARTESIA	0.970	0.330	0.170	0.310	0.200	0.110	0.100	0.100	0.100	0.060	0.120	0.160	0.090	0.080	0.060
SANTA FE CO (SANTA FE)	0.560	0.390	0.320	0.650	0.730	0.300	0.280	0.290	0.460	0.270	0.790	1.050	0.570	0.500	0.330
BERNALILLO CO (ALBUQUERQUE)	3.690	2.600	2.050	4.310	4.830	1.990	1.870	1.950	3.030	1.760	5.200	6.900	3.790	3.300	2.210
LEA CO															
TATUM	0.460	0.320	0.040	0.060	0.040	0.020	0.020	0.020	0.020	0.010	0.020	0.030	0.010	0.010	0.010
LOVINGTON	1.860	1.390	0.430	0.450	0.320	0.180	0.170	0.180	0.150	0.090	0.170	0.230	0.120	0.110	0.070
HOBBS	2.870	2.230	0.880	0.960	0.740	0.410	0.380	0.430	0.360	0.220	0.430	0.560	0.320	0.280	0.190
UNION CO (CLAYTON)	0.020	0.040	0.030	0.040	0.090	0.040	0.040	0.050	0.090	0.080	0.470	0.280	3.720	2.790	2.630
HARDING CO	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	29.250	0.000	0.000	0.000

Source: HDR Sciences. See text and preceding tables.

Table 2.4-11. Regional allocation assumptions for base payroll expenditures, Nevada/Utah (percent).

County	Base Location				
	Coyote Spring	Milford	Beryl	Delta	Ely
Clark, Nevada	95	5	5	--	5
Washoe, Nevada	--	--	--	--	--
Salt Lake/Utah, Utah	--	5	5	18	5
Beaver, Utah	--	55	10	--	--
Iron, Utah	--	35	60	--	--
Lincoln, Nevada	5	--	10	--	--
White Pine, Nevada	--	--	--	--	90
Washington, Utah	--	--	10	--	--
Millard, Utah	--	--	--	80	--
Juab, Utah	--	--	--	2	--
Total	100	100	100	100	100

T3981/9-24-81/F

Source: HDR Sciences. See text.

Table 2.4-12. COMMUNITY SHARES IN BASE PAYROLL EXPENDITURES
TEXAS/NEW MEXICO
(PERCENT)

COMMUNITY	BASE LOCATION	
	DALHART, TX	CLOVIS, NM
POTTER/RANDALL COS (AMARILLO TX)	0 100	0 040
MOORE CO , TX (DUMAS)	0 100	0 000
DALLAM CO , TX (DALHART)	0 250	0 000
HARTLEY CO , TX		
DALHART	0 500	0 000
HARTLEY	0 050	0 000
LUBBOCK CO , TX (LUBBOCK)	0 000	0 060
CURRY CO , NM (CLOVIS)	0 000	0 650
ROOSEVELT CO , NM (PORTALES)	0 000	0 250
CHAVES CO , NM (ROSWELL)	0 000	0 000

Source: HDR Sciences, See text.

For the Beryl operating base location, 60 percent of consumption expenditures are assumed to be made in Iron County, while Beaver County, Lincoln County, and Washington County each are assumed to receive 10 percent of base payroll expenditures. As with an operating base near Milford, Clark County, and Salt Lake/Utah counties are assumed each to received 5 percent of base payroll consumption expenditures.

For the proposed base near Delta, 80 percent of base consumption expenditures are assumed to occur in Millard County, Utah. An additional 18 percent are assumed to flow to Salt Lake and Utah counties, while the remaining 2 percent are assigned to Juab County.

For the proposed base near Ely, the relatively isolated character of White Pine County leads to the assumption that 90 percent of base payroll consumption expenditures would be made within White Pine County. Clark County and Salt Lake/Utah counties are each assumed to receive 5 percent of base payroll expenditures.

As indicated in Table 2.4-12, an operating base located southwest of Dalhart, Texas in Hartley County is assumed to result in 55 percent of base payroll expenditures being made in Hartley County. An additional 25 percent of expenditures are assumed to occur in Dallam County, while Potter/Randall counties and Moore County are assumed to receive 10 percent of expenditures each.

For an operating base at Clovis, New Mexico, 65 percent of base payroll consumption expenditures are projected to remain in Curry County. Roosevelt County is assumed to receive 25 percent of these expenditures, primarily because of the relatively short distance from the potential OB site and the City of Portales. The remaining 10 percent is distributed to Lubbock County (6 percent of total expenditures) and Potter/Randall counties (4 percent of expenditures).

Appendix F presents the estimated distribution of camp payroll consumption expenditures for each of the alternatives considered in this analysis. Appendix G presents the estimated distribution of base payroll consumption expenditures for all alternatives.

2.5 M-X PROCUREMENT DEMANDS

The local procurement demands of the M-X system are of three general types: construction materials, construction work-force support, and operations work-force support. Data on M-X procurement needs are incomplete--consequently, this analysis relies on estimates derived from other military bases and preliminary contractor plans. These data deficiencies do not appear critical, since procurement is likely to be a much smaller source of local economic stimulus than project payroll outlays.

CONSTRUCTION MATERIALS (2.5.1)

Procurement of construction materials is not likely to have a significant impact on the economies of the regions of influence, since most of these materials would be supplied from outside the Nevada/Utah and Texas/New Mexico deployment regions. The principal materials requirements are for cement, steel, petroleum, oil, lubricants, lumber, sand, and gravel.

Cement

Some of the cement needed to build the DDA and base facilities could be supplied by local manufacturers. However, no manufacturing facilities are currently located within the deployment regions, though several establishments are situated in adjacent areas. Much of this productive capacity would be employed without M-X deployment in either of the study regions, however, so the incremental output and employment attributable to M-X would be quite small.

Steel

A portion of the steel requirements of the M-X system could be supplied within the four deployment states. Most of the steel, however, would be imported from outside the regions of influence. As a consequence, no significant impact from project steel purchases is expected to occur within the deployment region.

Aggregate

Sand and gravel would be locally available, but would likely be supplied by Air Force construction contractors directly. The labor required to excavate and transport the aggregate is included in the direct project employment data.

Other Processed Inputs

Petroleum, oil, lubricants, lumber, and other processed construction inputs would largely be supplied from outside the regions of influence. Some induced economic activity within the regions would result from these procurement demands, but the level of such activity would likely be small.

Construction materials procurement consequently is not treated in this analysis as a significant source of indirect local project demand. Potential impacts of the M-X project on construction resource markets at a broad regional level have been treated elsewhere in the M-X environmental impact analysis (see ETR-25, "Cement," and ETR-26 "Steel Industry Effects").

CONSTRUCTION WORK-FORCE SUPPORT (2.5.2)

No data are available on the level and commodity composition of procurement by Air Force construction contractors to support personnel housed in construction camps throughout the deployment regions. This study assumes that the local economic effects of this type of procurement are captured by the payment of subsistence payments to construction workers. Most of this subsistence pay is assumed to be spent within the region, and is distributed in the same proportions as the rest of regional construction personnel consumption demands, detailed in Section 2.4.

OPERATIONS WORK-FORCE SUPPORT (2.5.3)

The value and composition of procurement administered by the M-X operating bases are somewhat uncertain. The best available data are from six currently operating Minuteman bases and Goodfellow Air Force Base, Texas. Table 2.5-1 presents estimates of operating procurement - both in the aggregate and per base

Table 2.5-1. AFB procurement: total, per-worker, and regional distribution for six Minuteman bases.

Air Force Base	Total Base Employment	Total Base Procurement Current Dollar ($ 000's)	Date of Procurement	Total Base Procurement FY-80 Dollars[1] ($ 000's)	Procurement Per Worker	Percentage Regional Distribution of Procurement		
						Region of Influence (%)	Rest of State (%)	Rest of U.S. (%)
Ellsworth	5,998	20,898.8	FY-76	27,388.3	4,566	48.3	5.6	46.1
Grand Forks	6,145	19,878.4	FY-77	24,691.6	4,018	32.4	29.8[2]	37.8
Malmstrom	5,971	11,398.3	FY-77	14,158.2	2,371	28.0	33.0	39.0
Minot	7,716	15,659.1	FY-75	21,701.6	2,813	38.0	27.0	35.0
Warren	4,717	12,229.9	FY-75	16,949.1	3,593	22.0	10.0	68.0
Whiteman	3,846	9,835.4	FY-76	12,889.5	3,351	14.4	46.9	38.7
Total or average	34,393	N.A	N.A.	117,778.3	3,424[3]	30.5[4]	25.4[4]	44.1[4]

T3972/9-29-81

[1] Adusted from current dollar data using the following fiscal year GNP deflators:

FY 1975: 125.04
FY 1976: 132.23
FY 1977: 139.51
FY 1980: 173.29

[2] Includes both North Dakota and Minnesota.

[3] Weighted average (total procurement divided by total employment).

[4] Simple average.

N.A. - Not applicable

Sources: U.S. Air Force, TAB A-1 Environmental Narrative: Ellsworth AFB, Rapid City, South Dakota, revised March 1977, Sec. 4.2.4.1, pg. 64; U.S. Air Force, TAB A-1 Environmental Narrative Phase II: Grand Forks AFB, Emerado, North Dakota, revised 19 April 1978, Sec. 4.2.4.1, pg. 73; U.S. Air Force, TAB A-1 Environmental Narrative: Malmstrom AFB, Great Falls, Montana, revised 15 August 1977, Sec. 4.2.4.1, pg. 4-21; U.S. Air Force, TAB a-1 Environmental Narrative: Minot AFB, Minot, North Dakota, revised 15 August 1977, Sec. 4.2.4.1, pg 60; U.S. Air Force, TAB A-1 Environmental Narrative Phase II: F.E. Warren AFB, Cheyenne, Wyoming, revised July 1977, Sec. 4.2.4.1, pg. 83; U.S. Air Force, TAB A-1 Environmental Narrative Phase II: Whiteman AFB, Knob Noster, Missouri, revised 10 August 1977, Sec. 4.2.4.1, pg. 86; for price deflators, Council of Economic Advisors, Economic Report of the President, Washington, D.C., selected years.

employee - for the six Minuteman bases. More than any other existing military installations, these six bases are similar in mission to the proposed M-X bases. Annual base procurement per worker (in fiscal year 1980 dollars) varies from $2,371 at Malmstrom AFB to $4,566 at Ellsworth AFB. Procurement per worker for these six bases averages about $3,500 per year. All six bases are located in sparsely populated areas of the upper Great Plains, and hence are in economic and geographic conditions somewhat similar to those of the Great Basin and High Plains.

Table 2.5-1 presents the approximate regional distribution of these procurement expenditures. On the average for all six bases, 30.5 percent of procurement was purchased within the region of influence of the base. An additional 25.4 percent was purchased from the rest of the state, while the remaining 44.1 percent originated in the rest of the United States.

Table 2.5-2 displays the value and commodity composition of base procurement for Goodfellow AFB, Texas. These data are based on a compilation of base records obtained from analysis of the impacts of closing the base. Procurement per worker at Goodfellow was significantly higher than the average for the six Minuteman bases - almost $5,000 annually compared to $3,500 (FY 1980 dollars). Most of this procurement was concentrated in food products, utilities, and services.

The Goodfellow AFB data are of particular interest because they are consistent with offbase expenditure patterns assumed in this study. The relationship between base procurement and offbase expenditures is particularly important, because the higher the propensity to purchase goods from onbase facilities such as the base commissary and exchange, the lower the share of offbase consumption expenditures and the greater the procurement demands of the base.

The Goodfellow data consequently are given greater weight in this study than the individual Minuteman bases. M-X operations procurement per worker is assumed to be the simple average of Goodfellow and Minuteman procurement estimates - $4,250 per year (fiscal year 1980 dollars).

Procurement to support workers at the Area Support Centers (ASCs) is estimated by the Air Force to average about $1.9 million annually per ASC. This procurement is added to the base procurement; these data are presented in Table 2.5-3. Assuming four ASCs would be constructed for a full deployment alternative, total ASC procurement would sum to nearly $7.7 million per year. Since ASC staffing patterns during the phasing-in of operations personnel are assumed to follow operating base staff levels, this annual figure has been converted to a procurement-per-worker estimate ($575 per year), then added to base procurement, yielding a total procurement figure per operations worker of $4,825 per year. Calculations of total procurement (ASC plus OB) are made by multiplying annual procurement per worker by the number of operations workers employed in a given year. This yields an aggregate procurement expenditure figure of $64.3 million annually. ASC procurement is then distributed across the ROI in the same proportions as operating base procurement.

The average regional distribution of procurement for the Minuteman bases is utilized in this analysis by assuming 30 percent of procurement would be supplied from the localized region of influence of the base, an additional 25 percent would originate in the metropolitan areas of the deployment region, and 45 percent would be supplied from the rest of the United States.

Table 2.5-2. Commodity and service procurement data by industry, Goodfellow AFB, Texas, 15 April 1977--15 April 1978. (Page 1 of 2)

Industry	Value of Local Purchases ($000s)	Percent of Total Local Purchases
1. Maintenance and repair of military facilities	483.9	4.6
2. Food and kindred products	3,166.8	30.0
3. Apparel and shoes	12.3	0.1
4. Other fabric products	59.6	0.6
5. Lumber products	58.4	0.6
6. Furniture	66.0	0.6
7. Paper and allied products	112.9	1.1
8. Printing and publishing	50.2	0.5
9. Chemicals and allied products	66.8	0.6
10. Drugs	372.8	3.5
11. Primary and fabricated metal products	117.2	1.1
12. Machinery, except electrical	32.9	0.3
13. Office machinery	176.6	1.7
14. Electrical machinery	46.2	0.4
15. Household appliances	40.1	0.4
16. Motor vehicles and parts	29.4	0.3
17. Other transportation equipment	18.4	0.2
18. Professional equipment, instruments, photography, equipment, etc.	279.4	2.6
19. Miscellaneous manufacturing	17.2	0.2
20. Communications	208.5	2.0

T3973/9-8-81

Table 2.5-2. Commodity and service procurement data by industry, Goodfellow AFB, Texas, 15 April 1977--15 April 1978. (Page 2 of 2)

Industry	Value of Local Purchases ($000s)	Percent of Total Local Purchases
21. Utilities	2,089.9	19.8
22. Personal services	982.2	9.3
23. Business services	1,116.7	10.6
24. Automotive and automotive repair services	89.7	0.8
25. Miscellaneous repair services	139.2	1.3
26. Professional services	697.8	6.6
27. Contract training services	37.4	0.4
Total	10,568.2	100.0
Total Full-Time Employees	2,602	
Procurement Per Employee, Current Dollars	4,062	
Procurement Per Employee, FY1980 Dollars	4,893	

T3973/9-28-81

[1]GNP implicit price deflator, average 1977:II-1978:I = 143.85 (Economic Report of the President, 1980). GNP implicit price deflator, average 1979:IV-1980:III = 173.29(Economic Report of the President, 1981). Ratio: 173.29/ 143 5 = 1.20466.

Source: U.S. Air Force, Headquarters Air Force Engineering and Services Center, Tyndall AFB, Florida. Personal communication from W. Allen Nixon, economist, 24 July 1980.

Table 2.5-3. Procurement assumptions for area support centers (ASCs), operating bases (OBs), and total procurement per worker.

Annual procurement per ASC (1980 $)	
Meals	$1,752,000
Personal use supplies	$ 78,000
Fuel	$ 36,500
Waste disposal	$ 50,800
Total	$1,917,300
Annual procurement for four ASCs (full deployment, 1980$)	$7,669,200
Total operations personnel (full deployment)	13,300
Annual ASC procurement per operations worker	$ 575
Annual OB procurement per operations worker	$ 4,250
Total annual procurement per operations worker	$ 4,825

T6045/10-2-81

Source: U.S. Air Force, AFRCE/M-X, and calculations by HDR Sciences.

The commodity composition of operations procurement is assumed to be a simplification of the Goodfellow AFB data. The commodity composition used in this analysis is shown in Table 2.5-4. The most significant assumption concerns food products, assumed to be supplied wholly from outside the ROI. Trade and transportation services associated with food and manufactured products procurement are assumed to be supplied within the ROI.

Tables 2.5-5 and 2.5-6 show the regional procurement allocation assumptions for the base locations analyzed in this study. These figures are consistent with the data from the TAB/A-1 Environmental Narratives. For example, a base located at Milford would be assumed to purchase 15 percent of its needs from Beaver County, 10 percent from Iron County, and 5 percent from Washington County, a total of 30 percent within the immediate vicinity of the base. An additional 25 percent would be procured from Salt Lake/Utah and Clark counties, so that 55 percent would be obtained from within the ROI.

Appendix H presents operations procurement figures by county and community that result from these assumptions. Since it is extremely difficult to predict the regional distribution of procurement outlays by sector, the sectoral composition of total procurement expenditures in each county is assumed to be that shown in Table 2.5-4. This sectoral share assumption allows the allocation of a representative mix of procurement demands to each of the affected counties.

2.6 PROJECT-RELATED INVESTMENT

Construction and operation of the base and DDA facilities and the changes in local employment and population associated with the project would require substantial investments in local infrastructure. Some investments would be spread broadly over the deployment region, as would be the case for highway improvements near DDA facilities. For the most part, however, these expenditures would be concentrated in the communities nearest the operating base locations.

Some of the investment would be public, while the rest would be from the private sector. Since these investments themselves have secondary multiplier effects, the level of project-related investment determines and is determined by the extent of employment and population expansion indirectly related to the project. Therefore, this analysis uses preliminary assumptions about total project-related population and employment growth to estimate local investment demand.

Project-related investment has been estimated for eight different categories: offbase housing, street facilities, school facilities, other public buildings, public and private utilities, retail buildings, commercial buildings, and industrial buildings. Some construction is implicit in the RIMS multiplier estimates of indirect output, though the extent of this endogenous construction demand would not be sufficient to capture the effects of large-scale construction. These investment demands consequently enter the analysis as exogenous changes in final demand for a number of construction sectors.

Tables 2.6-1 and 2.6-2 present the data used for estimating local project-related investment. These estimates are specific to the base sizes, as well as the fraction of military personnel and their dependents assumed to be living offbase. All dollar values are in FY 1980 dollars, and assume an 18.5 percent increase in

Table 2.5-4 Commodity composition of M-X base operations procurement.

R.I.M.S Sector Number	Commodity	Procurement Share (Percent)
72	Maintenance and repair of mil. facilities	7.7
446	Motor freight transportation	4.6
451	Communications	3.1
453	Electric services	10.3
454	Gas production and distribution	10.3
455	Water supply and sanitary services	10.2
456	Wholesale trade	9.2
457	Retail trade	3.1
466	Personal services	15.4
468	Business Services	15.4
470	Professional services	10.7
	Total	100.0

T3975/9-25-81/F

Source: Derived from data for Goodfellow Air Force Base, Texas, U.S. Air Force. See Table 2.5-2.

Note: The proportionate distribution shown here relates only to procurement supplied within the region of influence.

Table 2.5-5. Regional allocation assumptions for base procurement expenditures, Nevada/Utah (percent).

County	Base Location				
	Coyote Spring	Milford	Beryl	Delta	Ely
Clark, Nevada	50	10	15	--	10
Washoe, Nevada	--	--	--	--	5
Salt Lake/Utah, Utah	--	15	10	25	10
Beaver, Utah	--	15	5	--	--
Iron, Utah	--	10	15	5	--
White Pine, Nevada	--	--	--	--	30
Washington, Utah	5	5	10	--	--
Millard, Utah	--	--	--	20	--
Juab, Utah	--	--	--	5	--
Rest of U.S.	45	45	45	45	45
Total	100	100	100	100	100

T3976/9-29-81

Source: HDR Sciences, based on data from U.S. Air Force. See text and preceding tables.

Table 2.5-6. COMMUNITY SHARES IN REGIONAL BASE PROCUREMENT EXPENDITURES
TEXAS/NEW MEXICO
(PERCENT)

COMMUNITY	BASE LOCATION	
	CLOVIS, NM	DALHART, TX
POTTER/RANDALL COS (AMARILLO TX)	0 11	0 30
MOORE CO , TX (DUMAS)		0 04
DALLAM CO , TX (DALHART)		0 13
HARTLEY CO , TX (HARTLEY/DALHART)		0 13
LUBBOCK CO , TX (LUBBOCK)	0 11	0 05
CURRY CO , NM (CLOVIS)	0 25	
ROOSEVELT CO , NM (PORTALES)	0 05	
CHAVES CO , NM (ROSWELL)	0 03	

SOURCE: HDR SCIENCES, based on data from U.S. Air Force. See text and preceding tables.

TABLE 2.6-1. MIX BASE COMMUNITY RELATED INVESTMENT ASSUMPTIONS
BASE I THOUSANDS OF FISCAL YEAR 1988 DOLLARS

INVESTMENT CATEGORY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
60 PERCENT ONBASE													
OFFBASE HOUSING	13642	27282	40924	54565	54565	40924	40924	0	0	0	0	0	0
STREET FACILITIES	3849	7698	7698	7698	7698	3849	0	0	0	0	0	0	0
SCHOOL FACILITIES	0	0	6252	6252	12504	6252	0	0	0	0	0	0	0
OTHER PUBLIC BLDGS	0	0	0	3528	3528	0	0	0	0	0	0	0	0
UTILITIES	7548	15096	15096	15096	15096	7548	0	0	0	0	0	0	0
RETAIL BUILDINGS	0	5033	10065	20131	5033	10065	0	0	0	0	0	0	0
COMMERCIAL BUILDINGS	0	2338	4675	4675	4675	4675	2338	0	0	0	0	0	0
INDUSTRIAL BUILDINGS	0	0	0	0	2370	2370	4740	2370	0	0	0	0	0
80 PERCENT ONBASE													
OFFBASE HOUSING	10498	20996	31493	41990	41990	31493	31493	0	0	0	0	0	0
STREET FACILITIES	2960	5920	5920	5920	5920	2960	0	0	0	0	0	0	0
SCHOOL FACILITIES	0	0	4881	4881	9762	4881	0	0	0	0	0	0	0
OTHER PUBLIC BLDGS	0	0	0	3143	3143	0	0	0	0	0	0	0	0
UTILITIES	5806	11613	11613	11613	5806	5806	5806	0	0	0	0	0	0
RETAIL BUILDINGS	0	5033	10065	20131	5033	10065	0	0	0	0	0	0	0
COMMERCIAL BUILDINGS	0	2338	4675	4675	4675	4675	2338	0	0	0	0	0	0
INDUSTRIAL BUILDINGS	0	0	0	0	2370	2370	4740	2370	0	0	0	0	0
100 PERCENT ONBASE													
OFFBASE HOUSING	7327	14654	21981	29307	29307	21981	21981	0	0	0	0	0	0
STREET FACILITIES	2065	4131	4131	4131	4131	2065	0	0	0	0	0	0	0
SCHOOL FACILITIES	0	0	3522	3522	7044	3522	0	0	0	0	0	0	0
OTHER PUBLIC BLDGS	0	0	0	2757	2757	0	0	0	0	0	0	0	0
UTILITIES	4053	8105	8105	8105	4053	4053	4053	0	0	0	0	0	0
RETAIL BUILDINGS	0	5033	10065	20131	5033	10065	0	0	0	0	0	0	0
COMMERCIAL BUILDINGS	0	2338	4675	4675	4675	4675	2338	0	0	0	0	0	0
INDUSTRIAL BUILDINGS	0	0	0	0	2370	2370	4740	2370	0	0	0	0	0

Source HDR Sciences. SEE APPENDIX C.

TABLE 2.6 2. M X BASE COMMUNITY RELATED INVESTMENT ASSUMPTIONS
BASE II THOUSANDS OF FISCAL YEAR 1980 DOLLARS

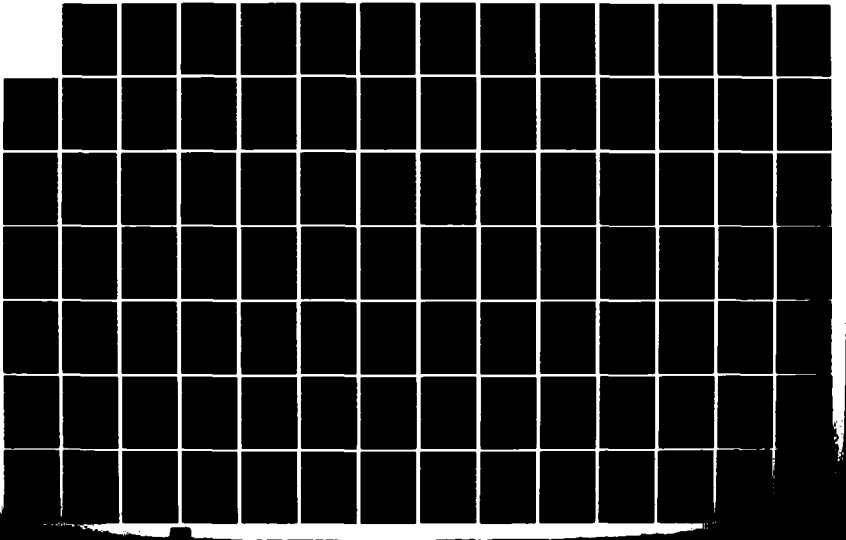
INVESTMENT CATEGORY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
60 PERCENT ONBASE													
OFFBASE HOUSING	0	0	10051	20102	30153	40206	40206	30153	30153	0	0	0	0
STREET FACILITIES	0	0	2836	5673	5673	5673	5673	2836	0	0	0	0	0
SCHOOL FACILITIES	0	0	0	0	4607	4607	9215	4607	0	0	0	0	0
OTHER PUBLIC BLDGS	0	0	0	0	0	2600	2600	0	0	0	0	0	0
UTILITIES	0	0	5561	11124	11124	11124	5561	5561	5561	0	0	0	0
RETAIL BUILDINGS	0	0	0	3708	7417	14834	3708	7417	0	0	0	0	0
COMMERCIAL BUILDINGS	0	0	0	1723	3445	3445	3445	3445	1723	0	0	0	0
INDUSTRIAL BUILDINGS	0	0	0	0	0	0	2370	2370	2370	2370	0	0	0
80 PERCENT ONBASE													
OFFBASE HOUSING	0	0	7736	15470	23206	30940	30940	23206	23206	0	0	0	0
STREET FACILITIES	0	0	2182	4362	4362	4362	4362	2182	0	0	0	0	0
SCHOOL FACILITIES	0	0	0	0	3596	3596	7193	3596	0	0	0	0	0
OTHER PUBLIC BLDGS	0	0	0	0	0	2315	2315	0	0	0	0	0	0
UTILITIES	0	0	4279	8558	8558	8558	8558	8558	4279	0	0	0	0
RETAIL BUILDINGS	0	0	0	3708	7417	14834	3708	7417	0	0	0	0	0
COMMERCIAL BUILDINGS	0	0	0	1723	3445	3445	3445	3445	1723	0	0	0	0
INDUSTRIAL BUILDINGS	0	0	0	0	0	0	2370	2370	2370	2370	0	0	0
100 PERCENT ONBASE													
OFFBASE HOUSING	0	0	5399	10798	16197	21595	21595	16197	16197	0	0	0	0
STREET FACILITIES	0	0	1523	3044	3044	3044	3044	1523	0	0	0	0	0
SCHOOL FACILITIES	0	0	0	0	2595	2595	5190	2595	0	0	0	0	0
OTHER PUBLIC BLDGS	0	0	0	0	0	2032	2032	0	0	0	0	0	0
UTILITIES	0	0	2986	5972	5972	5972	2986	2986	2986	0	0	0	0
RETAIL BUILDINGS	0	0	0	3708	7417	14834	3708	7417	0	0	0	0	0
COMMERCIAL BUILDINGS	0	0	0	1723	3445	3445	3445	3445	1723	0	0	0	0
INDUSTRIAL BUILDINGS	0	0	0	0	0	0	2370	2370	2370	2370	0	0	0

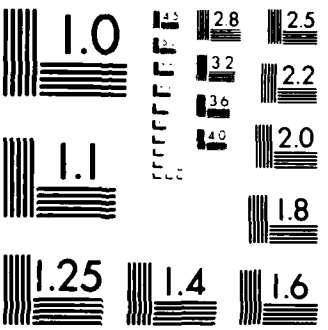
Source HDR Sciences. SEE APPENDIX C.

construction costs from 1978 to FY 1980. Since the largest single component of these expenditures would be offbase housing, the adjustment for inflation is based on the change in the implicit price deflator for gross private domestic investment in nonfarm residential structures. A plausible time path for each of the eight investment categories also was incorporated into the analysis, and is shown in the tables. This time path assumes relatively early development of project-related infrastructure to meet as large a share of peak population demands with permanent facilities as feasible. Appendix C contains the assumptions and computations used in deriving these data.

AD-A149 918 DEPLOYMENT AREA SELECTION AND LAND WITHDRAWAL/ACQUISITION M-X/MPS (M-X/MU.. (U) HENNINGSON DURHAM AND RICHARDSON SANTA BARBARA CA 02 OCT 81 2/3

UNCLASSIFIED M-X-ETR-27 F/G 16/1 NL





3.0 COUNTY-LEVEL INTERINDUSTRY MODELS

The indirect and induced effects of project-related changes in final demand within the study region are analyzed using county-level interindustry models derived from a modified version of the Regional Industrial Multiplier System. This analysis yields estimates of total M-X-related earnings and employment by place of employment.

The Regional Industrial Multiplier System (RIMS), originally developed at the Bureau of Economic Analysis, U.S. Department of Commerce, estimates industry-specific gross output multipliers for any county or group of counties in the United States. These multipliers are estimated from the input-output table of direct requirements coefficients for the U.S. economy (see Phillip M. Ritz, 1979) by adjusting these requirements to the county or regional level, using employment-based location quotients. The methodology, data, and assumptions underlying RIMS are presented in Appendix D.

3.1 RIMS EQUATION AND PARAMETERS

The Regional Industrial Multiplier System estimates indirect and induced effects of project-related expenditures in a region based on the direct effects of those expenditures and the characteristics of the region. An econometric equation relates the indirect and induced components of the multiplier for industry j in region r to the direct component ($A^r_{\cdot j}$), the fraction of total nongovernment earnings in the region originating in farming (P_1), the fraction of total nongovernment earnings in the region originating in manufacturing (P_2), and the share of total regional non-government earnings in total U.S. nongovernment earnings (S). This relationship has been estimated from a sample of survey-based regional input-output models for state and substate areas throughout the United States (see Appendix D). The RIMS equation used in this analysis is:

$$M^r_j = 1.65 - 0.79P_1 - 0.13P_2 + 0.17S + 1.03 \log A^r_{\cdot j}$$

As indicated in the equation, the magnitude of the multiplier is negatively related to the share of regional earnings originating in basic sectors--agriculture and manufacturing--and positively related to the size of the regional economy compared to the U.S. economy and to the size of the direct requirements coefficient.

Table 3.1-1 presents earnings data and RIMS parameter estimates for the Nevada/Utah ROI. The table presents total earnings, government earnings, farm earnings, and manufacturing earnings data from which the parameters used in the RIMS equation are derived. The estimates of P_1, P_2, and S also are presented in the table. These data (from the U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System, April 1981) are for 1979, the most recent available.

Significant differences in county economic structure are evident in the data presented in the table. Of the 12 Nevada/Utah ROI counties, six counties have a share of earnings originating in farming which is above the U.S. average--Beaver, Eureka, Lincoln, Millard, Washington, and White Pine counties. The estimate of

Table 3.1-1. Earnings data (1979) and RIMS parameter estimates for Nevada/Utah ROI counties.

County	Earnings (Thousands of Dollars)					RIMS Parameters		
	Total	Government	Non-Government	Farming	Manufacturing	P_1	P_2	S
Beaver, Utah	16,455	3,370	13,085	1,084	654	0.0828429	0.0499809	0.0000105
Clark, Nev.	3,259,673	483,029	2,776,644	3,613	126,738	0.0013012	0.0456443	0.0022255
Eureka, Nev.	13,718	873	12,845	3,160	9	0.2460101	0.0007007	0.0000103
Iron, Utah	70,857	17,619	53,238	1,417	5,285	0.0266163	0.0992712	0.0000427
Juab, Utah	20,091	3,839	16,252	356	6,042	0.0219050	0.3717696	0.0000130
Lincoln, Nev.	18,420	4,156	14,264	1,426	131	0.0999720	0.0091840	0.0000114
Millard, Utah	31,336	5,910	25,426	7,725	1,855	0.3038229	0.0729568	0.0000204
Nye, Nev.	122,678	12,438	110,240	1,510	1,527	0.0136974	0.0138516	0.0000884
Salt Lake/ Utah, Utah	5,051,234	732,498	4,317,735	19,223	957,363	0.0044521	0.2217281	0.0034615
Washington, Utah	74,739	14,099	60,640	2,925	8,635	0.0482355	0.1423978	0.0000486
White Pine, Nev.	44,535	10,273	34,262	1,937	7,062	0.0565349	0.2061176	0.0000275
United States	1,484,841,000	237,189,000	1,247,652,000	37,394,000	387,670,000	0.0299715	0.3107197	1.0000000

T5719/9-22-81

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System, April 1981.

Note: P_1 = farm earnings/total non-government earnings.
P_2 = manufacturing earnings/total non-government earnings.
S = regional non-government earnings/national non-government earnings.

RIMS parameter P_1 consequently is above its U.S. average value for these counties. Only one of the Nevada/Utah ROI counties--Juab County--has an earnings share in manufacturing (and hence a value of the parameter P_2) which is greater than the U.S. average. The remaining counties are characterized by values of P_2 which are less than the national average. With the exception of Clark and Salt Lake/Utah counties, the Nevada/Utah ROI counties are extremely small compared to the U.S. economy as a whole. Clark County was the source of 0.2 percent of total U.S. non-government earnings in 1979, and Salt Lake/Utah counties were the source of 0.3 percent of total U.S. nongovernment earnings.

The value of the variable A^r_i is determined in the RIMS model using the direct requirements matrix from the 1972 input-output study for the United States and regional location quotients estimated primarily from 1979 County Business Patterns (CBP) employment data. The location quotients derived from the CBP data represent an estimate of the relative concentration of the region's employment in each industry. The techniques used in this estimation are described in Appendix D. Given values of A^r_i and the RIMS parameters presented in Table 3.1-1, the RIMS equation estimates the total gross output multiplier for each industry in each of the Nevada/Utah ROI counties.

Table 3.1-2 presents analogous earnings data and RIMS parameter estimates for the Texas/New Mexico ROI counties. The estimates of P_1, P_2, and S are derived in the same fashion as for the Nevada/Utah ROI counties, and from the same data source. The dependence of the Texas/New Mexico ROI counties on farm earnings is greater than is the case for Nevada/Utah. Of the 24 Texas/New Mexico ROI counties, 18 have a larger share of non-government earnings in farming than the U.S. average. In addition, because of the volatility of farm earnings, some of the county farm earnings estimates for 1979 were negative. For these counties a zero value is used for the RIMS parameter P_1. Only two counties--Moore and Parmer in Texas--had 1979 earnings shares in manufacturing greater than the U.S. average. As indicated by the values of the parameter S, all of the county economies in the Texas/New Mexico ROI are extremely small in comparison to the U.S. as a whole.

3.2 MODIFIED LOCATION QUOTIENTS

One of the regional economic impacts of M-X deployment would be the development of new economic sectors. For example, building an M-X operating base or DDA facilities in a county would be likely to result in the development of new construction firms which would not be there without M-X. During the operating phase, a number of service and trade firms probably would locate in the region which would not be there in the absence of M-X. In order to account for these changes in county economic structure--changes which are the result of M-X deployment--this analysis introduces modifications to the employment-based location quotients utilized for a number of sectors in the local economies.

Modifications to location quotients are based on comparisons to other regions that currently contain Air Force bases. These comparisons are of two types. First, a review of employment patterns in counties containing Minuteman bases indicates a relatively large share of county employment in the service and trade sectors. Second, location quotients were calculated for the regions containing Cannon and Holloman Air Force bases in New Mexico. One of these--Cannon AFB in Curry County, New Mexico--is in the Texas/New Mexico ROI. Comparisons were made to

Table 3.1-2. Earnings data (1979) and RIMS parameter estimates for Texas/New Mexico ROI counties.

County	Earnings (Thousands of Dollars)					RIMS Parameters		
	Total	Government	Nongovernment	Farming	Manufacturing	P_1	P_2	S
Bailey, Tex.	45,695	3,907	41,788	15,937	5,676	0.3813774	0.1358285	0.0000335
Castro, Tex.	64,280	5,362	58,918	31,186	4,292	0.5293119	0.0728470	0.0000472
Chaves, N.Mex.	238,798	40,665	198,130	25,435	34,301	0.1283753	0.1731237	0.0001588
Cochran, Tex.	20,333	3,607	16,726	6,428	1,222	0.3843118	0.0730599	0.0000134
Curry, N.Mex.	214,709	79,811	134,898	13,048	13,508	0.0967249	0.1001349	0.0001081
Dallam, Tex.	36,510	3,789	32,721	4,083	3,766	0.1247822	0.1150943	0.0000262
Deaf Smith, Tex.	130,053	11,890	118,163	40,802	20,628	0.3453027	0.1745724	0.0000947
De Baca, N.Mex.	11,573	1,908	9,665	5,504	103	0.5694775	0.0106570	0.0000077
Hale, Tex.	200,150	22,909	177,241	46,470	29,777	0.2621854	0.1680029	0.0001421
Harding, N.Mex.	4,656	1,075	3,581	1,170	1,051	0.3267244	0.2934934	0.0000029
Hartley, Tex.	2,342	1,663	679	(4,842)	12	0.0000000	0.0176730	0.0000005
Hockley, Tex.	112,599	14,244	98,355	15,400	2,304	0.1565757	0.0234253	0.0000788
Lamb, Tex.	104,285	8,553	95,732	44,014	10,538	0.4597627	0.1100781	0.0000767
Lubbock, Tex.	1,275,765	252,747	1,023,018	32,620	206,047	0.0318860	0.2014107	0.0008200
Moore, Tex.	95,878	10,726	85,152	(8,261)	34,629	0.0000000	0.4066728	0.0000682
Oldham, Tex.	8,995	2,382	6,613	93	0	0.0140632	0.0000000	0.0000053
Parmer, Tex.	45,612	5,489	40,123	(1,582)	18,528	0.0000000	0.4617800	0.0000322
Potter/ Randall, Tex.	1,133,958	148,093	985,865	14,840	162,376	0.0150528	0.1647041	0.0007902
Quay, N.Mex.	47,269	9,178	38,091	5,609	1,408	0.1472526	0.0369641	0.0000305
Roosevelt, N.Mex.	69,524	18,825	50,699	22,921	2,779	0.4520996	0.0548137	0.0000406
Sherman, Tex.	13,914	2,189	11,725	1,363	76	0.1162473	0.0064819	0.0000094
Swisher, Tex.	51,671	5,825	45,846	19,839	2,815	0.4327313	0.0614012	0.0000367
Union, N.Mex.	38,984	4,390	34,594	23,943	555	0.6921142	0.0160432	0.0000277
United States	1,484,841,000	237,189,000	1,247,652,000	37,394,000	387,670,000	0.0299715	0.3107197	1.0000000

T5728/10-27-81/F

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System, April 1981.

Note: ( ) denotes negative number. Negative parameters are entered as zero.

P_1 = farm earnings/total nongovernment earnings.

P_2 = manufacturing earnings/total nongovernment earnings.

S = regional nongovernment earnings/national nongovernment earnings.

the location quotients calculated for these areas. This permits a more detailed review of the existing economic structure in areas which are similar to the proposed deployment regions and which currently contain Air Force bases.

Table 3.2-1 presents modified location quotients based on specific economic structural change assumptions. It is assumed that changes in economic structure as a result of M-X would be most prevalent in the construction sectors, including both new construction and maintenance and repair activities. As indicated in the table, Curry and Roosevelt counties and Otero County in New Mexico have estimated location quotients above 1 for virtually all of these construction sectors. For the rural Nevada/Utah ROI counties, many of these location quotients are significantly less than one and in many cases zero because these sectors are totally absent from the local economy. The assumed values used in this analysis are presented in Table 3.2-1 as well. Note that most of these location quotients are assumed to increase to 1.00, though several are assumed to increase only to 0.75 in cases where the estimated location quotients for the other counties were not as far above 1 as was otherwise the case. In addition to construction sectors, a number of transportation, trade, communication, and service sector location quotients are assumed to increase as a result of M-X. These include such sectors as passenger and freight transportation, communications, gas production and distribution, wholesale trade, banking, insurance and real estate, and a number of personal, business, health, and educational services. Another class of sectors for which location quotients are assumed to increase is food processing.

These modifications to the employment-based location quotients derived from County Business Patterns data are meant to be representative of the general pattern of structural change likely to accompany M-X deployment. However, it is extremely difficult to predict the precise nature of structural change in the local economy, so individual sectors may not change in the precise fashion indicated in Table 3.2-1.

The potential for economic structure change as a result of M-X deployment would be greatest in the Nevada/Utah region. Several of these counties are so sparsely developed that the use of multipliers based on existing economic structure would be very likely to underestimate the potential multiplier effects of the project on these local economies. The introduction of new industries would be most probable for these Nevada/Utah ROI counties. The process and assumptions used to incorporate economic structure change into the RIMS multipliers consequently has been applied to the Nevada/Utah ROI counties. In Texas/New Mexico, the probable extent of economic structure change in any one county is less than in Nevada/Utah. This is due in part to the somewhat more diverse nature of the local economies in the Texas/New Mexico ROI. In addition, the greater density of population and economic activity in the rural Texas/New Mexico ROI counties generally implies smaller proportionate impacts on any single county. As a result, the economic structure change assumptions for Nevada/Utah are not applied to the Texas/New Mexico ROI counties.

The changes in location quotients affect the multiplier estimates for each industry in the county, including those directly impacted by M-X final demands. The effect of these modifications is to increase the multipliers for each county analyzed.

Table 3.2-1. Economic structural change assumptions for Nevada/Utah ROI location quotients.(Page 1 of 4)

	RIMS Sector	Location Quotients: Curry and Roosevelt Counties New Mexico (Cannon AFB)	Location Quotients: Otero County New Mexico (Holloman)	Assumed Value
25	Stone and clay mining and quarrying	.5521	1.9637	1.0
27	New residential 1-unit structures, nonfarm	1.7622	1.5995	1.0
28	New residential 2-4-unit structures, nonfarm	1.7622	1.5995	1.0
29	New residential garden apartments	1.4624	1.5995	0.75
31	New residential additions and alterations, nonfarm	1.7622	1.5995	1.0
32	New hotels and motels	1.4624	1.5995	1.0
33	New dormitories	1.7622	1.5995	1.0
34	New industrial buildings	1.4624	1.5995	0.75
35	New office buildings	1.7622	1.5995	1.0
36	Warehouses	1.7622	1.5995	1.0
37	New garages and service stations	1.7622	1.5995	1.0
38	New stores and restaurants	1.7622	1.5995	1.0
39	New religious buildings	1.7622	1.5995	0.75
40	New educational buildings	1.7622	1.5995	0.75
41	New hospital and institutional buildings	1.7622	1.5995	0.75
42	New other nonfarm buildings	1.7622	1.5995	1.0
43	New telephone and telegraph facilities	1.2538	1.4104	0.75
45	New electric utility facilities	1.2538	1.4104	0.75
46	New gas utility facilities	1.2538	1.4104	0.75

T3334/9-29-81

Table 3.2-1. Economic structural change assumptions for Nevada/Utah ROI location quotients.(Page 2 of 4)

	RIMS Sector	Location Quotients: Curry and Roosevelt Counties New Mexico (Cannon AFB)	Location Quotients: Otero County New Mexico (Holloman)	Assumed Value
48	New water supply facilities	1.2538	1.4104	0.75
49	New sewer system facilities	1.2538	1.4104	0.75
50	New local transit facilites	1.2538	1.4104	0.75
51	New highways and streets	1.2538	1.4104	1.0
52	New farm housing units and additons and alterations	1.7622	1.5995	1.0
53	New farm services facilities	1.7622	1.5995	1.0
56	New military facilities	1.5624	1.5995	1.0
57	Conservation and development facilities	1.4624	1.5995	1.0
58	New nonbuilding facilities	1.4624	1.5995	0.75
60	Maintenance and repair, residential	1.7622	1.5995	1.0
61	Maintenance and repair of other nonfarm buildings	1.7622	1.5995	1.0
62	Maintenance and repair of farm residential buildings	1.7622	1.5995	1.0
63	Maintenance and repair of farm service facilities	1.7622	1.5995	1.0
64	Maintenance and repair of telephone and telegraph	1.2538	1.4104	1.0
65	Maintenance and repair of railroads	1.2638	1.4104	1.0
66	Maintenance and repair of electric utility facilities	1.2538	1.4104	1.0
67	Maintenance and repair of gas utility facilities	1.2538	1.4104	1.0
68	Maintenance and repair of petroleum pipelines	1.2538	1.4104	1.0
69	Maintenance and repair of water supply facilities	1.2538	1.4104	1.0

T3334/9-29-81

Table 3.2-1. Economic structural change assumptions for Nevada/Utah ROI location quotients.(Page 3 of 4)

	RIMS Sector	Location Quotients: Curry and Roosevelt Counties New Mexico (Cannon AFB)	Location Quotients: Otero County New Mexico (Holloman)	Assumed Value
70	Maintenance and repair of sewer facilities	1.2538	1.4104	1.0
71	Maintenance and repair of local transit facilities	1.2538	1.4104	1.0
72	Maintenance and repair of military facilities	1.4624	1.5995	1.0
73	Maintenance and repair of conservation and development facilities	1.4624	1.5995	1.0
74	Maintenance and repair of highways and streets	1.2538	1.4104	1.0
76	Maintenance and repair of other nonbuilding facilities	1.4624	1.5995	1.0
91	Fluid milk	2.1209	1.1196	1.0
205	Commercial printing	0.6007	1.1381	1.0
267	Ready-mixed concrete	1.9222	4.2121	1.0
445	Local, suburban, and interurban highway passenger transportation	2.5105	1.7477	1.0
466	Motor frieght transportation and warehousing	1.3798	0.7727	1.0
450	Transportation services	0.3040	0.6476	0.5
451	Communications, except radio and TV	1.2186	0.9602	1.0
454	Gas production and distribution (utilities)	3.8543	2.0810	1.0
456	Wholesale trade	1.1660	0.5425	0.75
458	Banking	1.3976	0.9971	1.0
459	Credit agencies	1.2844	1.6240	1.0
460	Security and commodity brokers	0.2872	0.18587	0.2
461	Insurance carriers	0.2014	0.0417	0.1
462	Insurance agents and brokers	1.6120	1.0238	0.75

T3334/9-29-81

Table 3.2-1. Economic structural change assumptions for Nevada/Utah ROI location quotients.(Page 4 of 4)

RIMS Sector		Location Quotients: Curry and Roosevelt Counties New Mexico (Cannon AFB)	Location Quotients: Otero County New Mexico (Holloman)	Assumed Value
464	Real Estate	0.8505	1.0238	0.75
466	Personal and repair services except auto and beauty and barber shops	1.6748	1.4717	1.0
468	Miscellaneous business services	0.4117	3.5150	0.75
469	Advertising	0.2330	0.22587	0.2
476	Hospitals	0.7980	0.8429	0.75
477	Other medical and health services	0.7654	0.1437	0.5
478	Education services	0.4119	0.5496	0.5
482	Residentail care	2.7060	0.1395	1.0
488	Local government passenger transit	2.5105	1.7477	1.0

T3334/9-29-81

Note: In addition to the Location Quotients assumptions shown in this table, Location quotients for the following industries were changed (assumed values are in parenthesis):

1 Dairy farm products (1.0)
2 Poultry and eggs (1.0)
12 Vegetables (0.5)
85 Poultry dressing plants (1.0)
86 Poultry and egg processing (1.0)
87 Creamery butter (1.0)
88 Cheese, natural and processed (1.0)
89 Condensed and evaporated milk (1.0)
90 Ice cream and frozen desserts (1.0)
106 Bread, cake, and related products (1.0)
116 Bottled and canned soft drinks (1.0)
164 Millworks (1.0)
265 Concrete block and bricks (1.0)
482 Child day-care services (1.0)

Any quotients shown as greater than one would be set equal to one prior to estimating direct components of multipliers (see Appendix D).

Source: HDR Sciences, based on data from U.S. Bureau of the Census, County Business Patterns, 1976.

3.3 RIMS MULTIPLIERS

The RIMS multipliers for Nevada/Utah ROI counties are presented in Table 3.3-1. For Clark, Salt Lake/Utah, and Washington counties, the table presents only unmodified RIMS multipliers--that is, multipliers based on the unmodified employment-based location quotients. In these counties economic effects of M-X deployment would be quite small compared to baseline economic conditions. For this reason, the degree of economic structure change was judged to be less significant than in the other counties and not significant enough to merit estimating modified RIMS multipliers.

Table 3.3-1 presents estimates of both modified and unmodified RIMS multipliers for the other ROI counties. The location quotient (LQ) assumptions presented in Table 3.2-1 result in increases in the key personal consumption expenditures (PCE) multiplier of 4.9 to 28.0 percent in these counties. In Nye and Eureka counties, the modifications result in increases of 28.0 and 27.6 percent, respectively, in the PCE multiplier. In White Pine and Lincoln counties, the proportionate increases resulting from the LQ modifications are 14.7 and 12.6 percent, respectively. The changes to the Utah ROI county multipliers are less than those for the Nevada ROI county multipliers as a result of these LQ modifications. In Beaver County, the modifications increase the PCE multiplier by 8.3 percent, while in Millard, Iron, and Juab counties the increases are 5.3, 4.9, and 4.9 percent, respectively.

A basic pattern which emerges from these results is that those counties with the lower unmodified multipliers, such as Eureka, Lincoln, and Nye counties, increase proportionately more as a result of the LQ modifications than do other counties. The only exception to this is White Pine County, where the large proportionate multiplier increase may be due to the relatively great dependence of the White Pine County economy on manufacturing, principally copper smelting. In 1979, 20.6 percent of county earnings were in manufacturing, which is higher than most other Nevada/Utah ROI counties. Since many of the economic sectors for which location quotients could change as a result of the project are absent from the White Pine County economy under historical conditions, LQ changes would have a relatively large impact on the multiplier estimates.

Table 3.3-2 presents the RIMS multipliers for the Texas/New Mexico ROI counties.

Table 3.3-3 presents RIMS multipliers for evaluating project-related investment expenditures in selected counties in the Nevada/Utah and Texas/New Mexico ROIs. As indicated in Section 2.6, this analysis includes 8 categories of project-related investment expenditures: off-base housing, street facilities, school facilities, other public buildings, utilities, retail buildings, commercial buildings, and industrial buildings. The multipliers used to evaluate the indirect effects of these expenditures are averages of selected construction-sector RIMS multipliers for the affected operating base areas. The off-base housing multipliers shown in Table 3.1-6 are averages of multipliers for single-family construction and multi-family construction. The multipliers shown for commercial buildings are averages for construction of several types of commercial buildings, including motels and other service establishments. Modified RIMS multipliers are used in the analysis for Beaver, Iron, Millard and White Pine counties. Unmodified multipliers are used for Clark, Curry, Dallam, Hartley and Roosevelt counties.

Table 3.3-1. RIMS multipliers, Nevada/Utah ROI counties

COUNTY	PCE[2]	RIMS Sectors[1] 72	446	451	453	454	455	456	457	466	468	470
Nevada												
Clark	2.248	2.447	2.579	2.353	2.010	2.120	2.131	2.442	2.609	2.540	2.736	2.878
Eureka												
Unmodified	1.159	1.695	1.719	1.650	1.307	1.207	1.422	1.620	1.739	1.587	1.725	1.832
Modified	1.479	1.842	2.021	1.773	1.504	1.801	1.624	1.776	1.884	1.836	1.929	1.983
Lincoln												
Unmodified	1.529	1.838	2.006	1.779	1.572	1.552	1.672	1.817	1.880	1.804	1.958	2.050
Modified	1.721	1.900	2.064	1.811	1.657	2.119	1.697	1.859	1.957	1.897	2.005	2.097
Nye												
Unmodified	1.271	1.896	1.992	1.922	1.500	1.661	1.703	1.887	2.001	1.872	2.074	2.176
Modified	1.627	2.049	2.276	1.971	1.635	2.358	1.782	1.996	2.113	2.054	2.177	2.263
White Pine												
Unmodified	1.643	1.851	2.001	1.797	1.545	1.438	1.618	1.864	1.958	1.870	1.983	2.096
Modified	1.885	1.974	2.210	1.883	1.712	2.075	1.771	1.964	2.051	2.004	2.114	2.192
Utah												
Beaver												
Unmodified	1.663	1.778	1.892	1.734	1.422	1.254	1.580	1.766	1.854	1.834	1.906	2.008
Modified	1.801	1.853	2.059	1.762	1.500	1.777	1.629	1.830	1.887	1.893	1.957	2.050
Iron												
Unmodified	1.793	1.963	2.077	1.890	1.650	1.382	1.710	1.937	2.057	1.999	2.109	2.198
Modified	1.880	1.996	2.226	1.897	1.724	1.992	1.737	1.964	2.058	2.009	2.121	2.204
Juab												
Unmodified	1.711	1.850	2.054	1.755	1.438	1.256	1.626	1.819	1.890	1.878	1.933	2.031
Modified	1.794	1.875	2.075	1.773	1.507	1.788	1.639	1.843	1.899	1.908	1.976	2.065
Millard												
Unmodified	1.593	1.708	1.870	1.652	1.393	1.214	1.535	1.711	1.794	1.727	1.828	1.890
Modified	1.678	1.752	1.915	1.680	1.479	1.689	1.585	1.727	1.796	1.780	1.842	1.899
Salt Lake/Utah	2.545	2.661	2.860	2.297	2.186	2.339	2.115	2.459	2.587	2.670	2.732	2.778
Washington	1.789	1.951	2.151	1.880	.516	1.612	1.749	1.952	2.039	2.023	2.136	2.218

[1]RIMS sectors are defined as follows:

Sector Code	Sector Name
PCE	Personal consumption expenditures
72	Maintenance and repair of military facilities
446	Motor freight transportation
451	Communications
453	Electric services
454	Gas production and distribution
455	Water supply and sanitary services
456	Wholesale trade
457	Retail trade
466	Personal services
468	Business services
470	Professional services

[2]Modified PCE multipliers were further raised to 1.800 for those counties where the LQ modifications resulted in PCE multipliers of less than 1.800.

Source: HDR Sciences, Regional Industrial Multiplier System, based on data from U.S. Bureau of Economic Analysis, U.S. Bureau of the Census, and other federal and state agencies.

NOTE: Multipliers for Clark, Salt Lake/Utah, and Washington counties are unmodified. Modified multipliers for the other counties shown were used in the impact analysis.

Table 3.3-2. RIMS multipliers, Texas/New Mexico ROI counties (Page 1 of 2).

County	PCE	RIMS Sectors[1] 72	446	451	453	454	455	456	457	466	468	470
Texas												
Bailey	1.721	1.798	1.991	1.722	1.581	1.729	1.628	1.783	1.859	1.814	1.903	1.951
Castro	1.635	1.834	1.948	1.685	1.521	1.697	1.565	1.731	1.807	1.771	1.850	1.894
Cochran	1.509	1.706	1.820	1.652	1.525	1.930	1.504	1.695	1.766	1.741	1.818	1.876
Dallam	1.851	1.928	2.152	1.835	1.674	1.848	1.690	1.914	1.990	1.950	2.062	2.157
Deaf Smith	1.836	1.864	2.063	1.774	1.622	1.782	1.637	1.839	1.922	1.902	1.971	2.039
Hale	1.892	1.996	2.187	1.185	1.674	1.345	1.733	1.900	1.973	1.965	2.017	2.070
Hartley	1.679	1.797	1.994	1.723	1.582	1.773	1.628	1.769	1.850	1.804	1.887	1.935
Hockley	1.737	1.920	2.202	1.842	1.646	1.640	1.596	1.750	1.911	1.922	2.012	2.082
Lamb	1.664	1.774	2.006	1.712	1.520	1.430	1.608	1.792	1.868	1.837	1.922	1.988
Lubbock	2.302	2.383	2.635	2.168	1.861	1.550	1.964	2.268	2.399	2.387	2.514	2.583
Moore	1.972	2.055	2.313	1.939	1.797	2.286	1.833	2.034	2.121	2.082	2.193	2.283
Oldham	1.547	1.866	2.018	1.742	1.526	1.244	1.573	1.822	1.861	1.809	1.141	2.038
Parmer	1.812	1.966	2.204	1.873	1.662	1.885	1.718	1.945	2.037	1.986	2.093	2.169
Potter/ Randall	2.360	2.395	2.712	2.188	2.105	2.615	2.010	2.322	2.426	2.465	2.534	2.606
Sherman	1.724	1.872	2.086	1.785	1.634	1.800	1.649	1.842	1.928	1.887	1.981	2.051
Swisher	1.631	1.754	1.960	1.683	1.508	1.233	1.566	1.732	1.777	1.772	1.8.7	1.875

T5738/9-29-81/F

Table 3.3-2. RIMS multipliers, Texas/New Mexico ROI counties (Page 2 of 2).

County	RIMS Sectors[1]										
	PCE	72	446	451	453	454	455	456	457	466	468	470
New Mexico												
Chaves	2.093	2.039	2.278	1.934	1.753	2.274	1.810	2.025	2.114	2.109	2.190	2.282
Curry	2.018	2.042	2.284	1.936	1.751	1.961	1.794	2.017	2.111	2.090	2.178	2.253
De Baca	1.555	1.644	1.710	1.609	1.400	1.645	1.501	1.629	1.724	1.659	1.729	1.794
Harding	1.534	1.723	1.859	1.646	1.424	1.666	1.528	1.659	1.739	1.708	1.780	1.819
Quay	1.841	1.921	2.120	1.820	1.537	1.838	1.712	1.882	1.950	1.949	2.028	2.123
Roosevelt	1.724	1.782	1.955	1.707	1.572	1.971	1.611	1.751	1.833	1.783	1.872	1.924
Union	1.572	1.666	1.771	1.605	1.482	1.635	1.470	1.660	1.727	1.678	1.743	1.825

T5738/9-29-81/F

[1]See RIMS sector numbers as identified in preceding table.

Source: HDR Sciences, Regional Industrial Multiplier System, based on data from U.S. Bureau of Economic Analysis, U.S. Bureau of the Census, and other federal and state agencies.

Table 3.3-3. RIMS multipliers for project-related investment expenditures, selected Nevada/Utah and Texas/New Mexico ROI counties

COUNTY	OFFBASE HOUSING	STREET FACILITIES	SCHOOL FACILITIES	OTHER PUB. BUILDINGS	UTILITIES	RETAIL BUILDINGS	COMMERCIAL BUILDINGS	INDUSTRIAL BUILDINGS
Nevada/Utah								
Beaver	1.822	1.926	1.803	1.768	1.785	1.786	1.661	1.660
Clark	2.341	2.511	2.368	2.444	2.335	2.345	2.152	2.094
Iron	1.960	2.068	1.865	1.842	1.873	1.872	1.748	1.752
Millard	1.716	1.805	1.643	1.620	1.650	1.650	1.561	1.949
White Pine	1.924	2.052	1.877	1.840	1.871	1.870	1.741	1.744
Texax/New Mexico								
Curry	1.981	2.158	1.979	1.906	1.985	1.969	1.921	1.829
Dallam	1.894	2.008	1.873	1.835	1.854	1.855	1.719	1.717
Hartley	1.723	1.846	1.621	1.602	1.649	1.647	1.574	1.579
Roosevelt	1.719	1.833	1.660	1.619	1.658	1.656	1.574	1.583

Source: HDR Sciences, Regional Industrial Multiplier System, based on data from U.S. Bureau of Economic Analysis, U.S. Bureau of the Census, and other federal and state agencies.

NOTE: Modified RIMS multipliers are used for Beaver, Iron, Millard, and White Pine counties. Multipliers for the remaining counties are based on unmodified location quotients.

For the potential operating base site in Hartley County, project-related investment expenditures are assumed to be split evenly between Dallam and Hartley counties. As a result, 50 percent of the project-related expenditures are evaluated using Dallam County multipliers, and 50 percent are evaluated using Hartley County multipliers. For the operating base site near Clovis, 75 percent of the project-related investment offbase is assumed to occur in Curry County and is evaluated using Curry County multipliers. The remaining 25 percent of project-related investment expenditures associated with the Clovis OB are assumed to occur in Roosevelt County, and are evaluated using Roosevelt County multipliers. For the remaining operating base sites, project-related investment expenditures are assumed to occur in the county in which the base is sited, and are evaluated using that county's multipliers. Though some spillover effects are possible, particularly for a base sited near Beryl or Milford, these effects probably would be small enough to be captured by the normal multiplier analysis of personal consumption expenditures, and hence have not been specifically allocated across county boundaries.

3.4 INDIRECT AND INDUCED GROSS OUTPUT, EARNINGS, AND EMPLOYMENT

Given a change in sectoral final demand and that industry's estimated multiplier, the change in regional gross output is simply the product of the multiplier and the final demand change. These computations are performed for each category of final demand change - personal consumption expenditures, procurement outlays, and related investment, by sector - and added together to estimate the total change in regional gross output, considering all the project-related changes in final demand. These demand changes are presented in Section 2.

This total gross output change is not, however, assumed to take place all within the same year in which the demands originate. Some lag between initial changes in demand and the full multiplier effects of those demand changes would be likely. The length and distribution of this lag is uncertain, since comprehensive industry-specific data are not available for the states under consideration as deployment areas. As an approximation, this analysis assumes that 70 percent of these multiplier effects occur the first year, 20 percent the second year, and 10 percent the third year. Previous work indicates the potential for considerably longer lags in some cases. For example, data available for the Oklahoma economy indicate an interindustry average longer than this three-year lag structure (see Liew, 1977). However, the Oklahoma data probably are more representative of incremental changes in an economy than of large, consumption-oriented demands such as those likely to accompany the M-X project.

The change in total output is translated into a change in region-wide earnings by using industry-specific and region-specific earnings-gross output ratios. These coefficients are derived from the data presented in Table 3.4-1. Total indirect and induced earnings are then used to estimate indirect and induced employment.

Table 3.4-1. Earnings - Gross Output Ratios Used in the M-X Economic Impact Analysis.

Industry	U.S. Average Earnings--Gross Output Ratio[1]
Personal Consumption Expenditures	0.3412
Maintenance and Repair of Military Facilities	0.4420
Motor Freight Transportation	0.4630
Communications	0.4180
Electric Services	0.1810
Gas Production and Distribution	0.1220
Water Supply and Sanitary Services	0.2270
Wholesale Trade	0.3920
Retail Trade	0.4760
Personal Services	0.3760
Business Services	0.4570
Professional Services	0.5290
Offbase Housing Construction	0.3290
Street Facilities Construction	0.3530
School Facilities Construction	0.2880
Other Public Buildings Construction	0.3130
Utilities Construction	0.3020
Retail Buildings Construction	0.3060
Commercial Buildings Construction	0.3060
Industrial Buildings Construction	0.3030

T5739/9-17-81

[1]The earnings: gross output ratio for industry i in region j (e(i,j)) is estimated as:

$$e(i, j) = (1/m(i, j))e(i) + (1 - 1/m(i, j))e^*$$

where m(i, j) is the estimated multiplier for industry i in region j, e(i) is the U.S. average earnings: gross output ratio for industry i shown in this table, and e* is the U.S. economy-wide average earnings: gross output ratio, 0.3412. Note the U.S. average ratio is used for personal consumption expenditures.

Source: 1972 U.S. Input-Output Tables, Bureau of Economic Analysis, U.S. Department of Commerce.

4.0 EMPLOYMENT, LABOR FORCE, AND POPULATION IMPACTS BY PLACE OF RESIDENCE

Project demands and interindustry estimates of M-X-related employment yield estimates of the primary and secondary employment impacts of the M-X system by place of employment. The next stage of the analysis translates these impacts by place of employment into impacts by place of residence. The results specifically introduce cross-county migration into the analysis, projecting a single-county demand for labor into a multicounty labor market. Comparing these employment impacts by county of residence to the available resident labor force in that county then permits estimation of labor force and population migration into the county.

4.1 EMPLOYMENT-RESIDENCE ADJUSTMENT ASSUMPTIONS

The county interindustry models and project-related final demand changes produce estimates of labor demand by county of employment. These projections are translated into labor demand projections by county of residence by means of employment-residence allocation matrices by employment type. These matrices incorporate assumptions about the place of residence of persons employed as a result of the project. The matrices also transform a "point" labor demand into an area labor demand which spills across county boundaries. These matrices are estimated judgmentally, using general gravity-type considerations of distance to nearby population centers and the level of services likely to be available at each place. These matrices are specific to each employment type but constant through time.

The matrices for the Nevada/Utah study region for all seven employment types - DDA construction, DDA assembly and checkout, base construction, base assembly and checkout, military personnel, operations civilians, and indirectly employed persons - are presented as Tables 4.1-1 through 4.1-7. The Nevada/Utah tables are followed by matrices for Texas/New Mexico for the same seven employment types, Tables 4.1-8 through 4.1-14. The counties identified down the left side of the tables are counties where M-X-related employment would occur, while counties of residence are listed across the top of the table. For example, in Table 4.1-6, civilian operations workers employed on a base at Milford in Beaver County (row 7) are assumed to live in Beaver and Iron counties (columns 7 and 6) in the proportions shown--75 percent in Beaver County and 25 percent in Iron County.

Of the seven matrices for each region, two are identical to other matrices for that region. The matrix for DDA assembly and checkout workers is the same as that for DDA construction workers. The matrix for OB assembly and checkout workers matches that for OB construction workers.

The employment-residence allocations for military operations personnel differ somewhat from the allocations for civilian operations personnel. Military personnel are assumed to be more concentrated in the counties where the OBs would be located because of the advantages of using base facilities (such as the exchange and commissary) - advantages not equally shared by civilian workers.

All indirectly employed workers are assumed to live in the counties where they would be employed. While cross-country commuting of indirectly employed workers

TABLE 4.1-1 DDA CONSTRUCTION EMPLOYMENT - RESIDENCE ALLOCATION MATRIX, NEVADA/UTAH (PERCENT).

COUNTY OF EMPLOYMENT	COUNTY OF RESIDENCE 1	2	3	4	5	6	7	8	9	10	11
1	95	0	0	5	0	0	0	0	0	0	0
2	0	90	0	0	10	0	0	0	0	0	0
3	5	5	90	0	0	0	0	0	0	0	0
4	5	0	0	95	0	0	0	0	0	0	0
5	0	0	0	0	100	0	0	0	0	0	0
6	0	0	0	0	0	100	0	0	0	0	0
7	0	10	0	0	0	10	80	0	0	0	0
8	0	0	0	0	0	0	10	85	5	0	0
9	0	0	0	0	0	0	0	30	65	5	0
10	0	0	0	0	0	0	0	0	0	100	0
11	0	0	0	0	0	0	0	0	0	0	100

COUNTY KEY

1-WHITE PINE
2-LINCOLN
3-NYE
4-EUREKA
5-CLARK
6-IRON
7-BEAVER
8-MILLARD
9-JUAB
10-SALT LAKE/UTAH
11-WASHINGTON

CT0139
18 MAY 1981

TABLE 4.1-2. DDA ASSEMBLY + CHECKOUT EMPLOYMENT - RESIDENCE ALLOCATION MATRIX, NEVADA/UTAH (PERCENT).

COUNTY OF EMPLOYMENT	COUNTY OF RESIDENCE 1	2	3	4	5	6	7	8	9	10	11
1	95	0	0	5	0	0	0	0	0	0	0
2	0	90	0	0	10	0	0	0	0	0	0
3	5	5	90	0	0	0	0	0	0	0	0
4	5	0	0	95	0	0	0	0	0	0	0
5	0	0	0	0	100	0	0	0	0	0	0
6	0	0	0	0	0	100	0	0	0	0	0
7	0	10	0	0	0	10	80	0	0	0	0
8	0	0	0	0	0	0	10	85	5	0	0
9	0	0	0	0	0	0	0	30	65	5	0
10	0	0	0	0	0	0	0	0	0	100	0
11	0	0	0	0	0	0	0	0	0	0	100

COUNTY KEY

1-WHITE PINE
2-LINCOLN
3-NYE
4-EUREKA
5-CLARK
6-IRON
7-BEAVER
8-MILLARD
9-JUAB
10-SALT LAKE/UTAH
11-WASHINGTON

CT0140
18 MAY 1981

TABLE 4.1-3. BASE CONSTRUCTION EMPLOYMENT - RESIDENCE ALLOCATION MATRIX, NEVADA/UTAH (PERCENT).

COUNTY OF EMPLOYMENT	COUNTY OF RESIDENCE 1	2	3	4	5	6	7	8	9	10	11
1	100	0	0	0	0	0	0	0	0	0	0
2	0	100	0	0	0	0	0	0	0	0	0
3	0	0	100	0	0	0	0	0	0	0	0
4	0	0	0	100	0	0	0	0	0	0	0
5	0	5	0	0	95	0	0	0	0	0	0
6	0	15	0	0	0	65	5	0	0	0	15
7	0	0	0	0	0	25	70	5	0	0	0
8	0	0	0	0	0	0	5	85	10	0	0
9	0	0	0	0	0	0	0	0	100	0	0
10	0	0	0	0	0	0	0	0	0	100	0
11	0	0	0	0	0	0	0	0	0	0	100

COUNTY KEY — CT0141

1-WHITE PINE
2-LINCOLN
3-NYE
4-EUREKA
5-CLARK
6-IRON
7-BEAVER
8-MILLARD
9-JUAB
10-SALT LAKE/UTAH
11-WASHINGTON

18 MAY 1981

TABLE 4.1-4. BASE ASSEMBLY + CHECKOUT EMPLOYMENT - RESIDENCE ALLOCATION MATRIX, NEVADA/UTAH (PERCENT).

COUNTY OF EMPLOYMENT	COUNTY OF RESIDENCE 1	2	3	4	5	6	7	8	9	10	11
1	100	0	0	0	0	0	0	0	0	0	0
2	0	100	0	0	0	0	0	0	0	0	0
3	0	0	100	0	0	0	0	0	0	0	0
4	0	0	0	100	0	0	0	0	0	0	0
5	0	5	0	0	95	0	0	0	0	0	0
6	0	15	0	0	0	65	5	0	0	0	15
7	0	0	0	0	0	25	70	5	0	0	0
8	0	0	0	0	0	0	5	85	10	0	0
9	0	0	0	0	0	0	0	0	100	0	0
10	0	0	0	0	0	0	0	0	0	100	0
11	0	0	0	0	0	0	0	0	0	0	100

COUNTY KEY — CT0142

1-WHITE PINE
2-LINCOLN
3-NYE
4-EUREKA
5-CLARK
6-IRON
7-BEAVER
8-MILLARD
9-JUAB
10-SALT LAKE/UTAH
11-WASHINGTON

18 MAY 1981

TABLE 4 1-5 MILITARY OPERATIONS EMPLOYMENT - RESIDENCE ALLOCATION MATRIX, NEVADA/UTAH (PERCENT)

COUNTY OF EMPLOYMENT	COUNTY OF RESIDENCE 1	2	3	4	5	6	7	8	9	10	11
1	100	0	0	0	0	0	0	0	0	0	0
2	0	100	0	0	0	0	0	0	0	0	0
3	0	0	100	0	0	0	0	0	0	0	0
4	0	0	0	100	0	0	0	0	0	0	0
5	0	5	0	0	95	0	0	0	0	0	0
6	0	5	0	0	0	85	5	0	0	0	5
7	0	0	0	0	0	10	90	0	0	0	0
8	0	0	0	0	0	0	0	100	0	0	0
9	0	0	0	0	0	0	0	0	100	0	0
10	0	0	0	0	0	0	0	0	0	100	0
11	0	0	0	0	0	0	0	0	0	0	100

COUNTY KEY — CTO143

1-WHITE PINE	5-CLARK	9-JUAB	18 MAY 1981
2-LINCOLN	6-IRON	10-SALT LAKE/UTAH	
3-NYE	7-BEAVER	11-WASHINGTON	
4-EUREKA	8-MILLARD		

TABLE 4 1-6 CIVILIAN OPERATIONS EMPLOYMENT - RESIDENCE ALLOCATION MATRIX, NEVADA/UTAH (PERCENT)

COUNTY OF EMPLOYMENT	COUNTY OF RESIDENCE 1	2	3	4	5	6	7	8	9	10	11
1	100	0	0	0	0	0	0	0	0	0	0
2	0	100	0	0	0	0	0	0	0	0	0
3	0	0	100	0	0	0	0	0	0	0	0
4	0	0	0	100	0	0	0	0	0	0	0
5	0	5	0	0	95	0	0	0	0	0	0
6	0	15	0	0	0	70	5	0	0	0	10
7	0	0	0	0	0	25	75	0	0	0	0
8	0	0	0	0	0	0	5	90	5	0	0
9	0	0	0	0	0	0	0	0	100	0	0
10	0	0	0	0	0	0	0	0	0	100	0
11	0	0	0	0	0	0	0	0	0	0	100

COUNTY KEY — CTO144

1-WHITE PINE	5-CLARK	9-JUAB	18 MAY 1981
2-LINCOLN	6-IRON	10-SALT LAKE/UTAH	
3-NYE	7-BEAVER	11-WASHINGTON	
4-EUREKA	8-MILLARD		

TABLE 4 1-7. INDIRECT EMPLOYMENT - RESIDENCE ALLOCATION MATRIX, NEVADA/UTAH (PERCENT).

COUNTY OF EMPLOYMENT	COUNTY OF RESIDENCE										
	1	2	3	4	5	6	7	8	9	10	11
1	100	0	0	0	0	0	0	0	0	0	0
2	0	100	0	0	0	0	0	0	0	0	0
3	0	0	100	0	0	0	0	0	0	0	0
4	0	0	0	100	0	0	0	0	0	0	0
5	0	0	0	0	100	0	0	0	0	0	0
6	0	0	0	0	0	100	0	0	0	0	0
7	0	0	0	0	0	0	100	0	0	0	0
8	0	0	0	0	0	0	0	100	0	0	0
9	0	0	0	0	0	0	0	0	100	0	0
10	0	0	0	0	0	0	0	0	0	100	0
11	0	0	0	0	0	0	0	0	0	0	100

COUNTY KEY

1-WHITE PINE
2-LINCOLN
3-NYE
4-EUREKA
5-CLARK
6-IRON
7-BEAVER
8-MILLARD
9-JUAB
10-SALT LAKE/UTAH
11-WASHINGTON

CT0145
18 MAY 1981

TABLE 4 1-B DDA CONSTRUCTION EMPLOYMENT - RESIDENCE ALLOCATION MATRIX, TEXAS/NEW MEXICO (PERCENT)

COUNTY OF EMPLOYMENT	COUNTY OF RESIDENCE																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	70	10	0	0	0	0	5	0	0	10	0	0	0	0	0	0	5	0	0	0	0	0	0
2	15	65	0	0	0	0	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	60	0	0	0	0	35	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0
4	0	0	5	60	5	0	0	10	0	0	0	5	0	0	0	5	0	0	0	10	0	0	0
5	0	0	0	5	60	0	0	0	5	0	0	10	0	5	0	0	0	0	0	10	5	0	0
6	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0
16	0	0	10	0	0	0	0	30	0	0	5	0	0	0	0	55	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0
18	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65	25	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	15	10	0	5
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0
21	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	15	70	5	5
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100

COUNTY KEY

1-DALLAM	6-COCHRAN	11-SWISHER	16-CASTRO	21-ROOSEVELT
2-HARTLEY	7-MOORE	12-LAMB	17-UNION	22-CHAVES
3-DEAF SMITH	8-POTTER/RANDALL	13-HALE	18-HARDING	23-DE BACA
4-PARMER	9-LUBBOCK	14-HOCKLEY	19-QUAY	
5-BAILEY	10-SHERMAN	15-OLDHAM	20-CURRY	

CTO146
18 MAY 1981

TABLE 4 1-9 DDA ASSEMBLY + CHECKOUT EMPLOYMENT - RESIDENCE ALLOCATION MATRIX, TEXAS/NEW MEXICO (PERCENT)

COUNTY OF EMPLOYMENT	COUNTY OF RESIDENCE																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	70	10	0	0	0	0	5	0	0	10	0	0	0	0	0	0	5	0	0	0	0	0	0
2	15	65	0	0	0	0	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	60	0	0	0	0	35	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0
4	0	0	5	60	5	0	0	10	0	0	0	5	0	0	0	5	0	0	0	10	0	0	0
5	0	0	0	5	60	0	0	0	5	0	0	10	0	5	0	0	0	0	0	10	5	0	0
6	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0
16	0	0	10	0	0	0	0	30	0	0	5	0	0	0	0	55	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0
18	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65	25	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	15	10	0	5
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0
21	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	15	70	5	5
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100

COUNTY KEY

1-DALLAM	6-COCHRAN	11-SWISHER	16-CASTRO	21-ROOSEVELT
2-HARTLEY	7-MOORE	12-LAMB	17-UNION	22-CHAVES
3-DEAF SMITH	8-POTTER/RANDALL	13-HALE	18-HARDING	23-DEBACA
4-PARMER	9-LUBBOCK	14-HOCKLEY	19-QUAY	
5-BAILEY	10-SHERMAN	15-OLDHAM	20-CURRY	

CT0147
18 MAY 1981

TABLE 4 1-10 BASE CONSTRUCTION EMPLOYMENT - RESIDENCE ALLOCATION MATRIX, TEXAS/NEW MEXICO (PERCENT)

COUNTY OF EMPLOYMENT	COUNTY OF RESIDENCE																					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	15	65	0	0	0	0	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0
20	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	20	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100

COUNTY KEY

1-DALLAM	6-COCHRAN	11-SWISHER	16-CASTRO	21-ROOSEVELT
2-HARTLEY	7-MOORE	12-LAMB	17-UNION	22-CHAVES
3-DEAF SMITH	8-POTTER/RANDALL	13-HALE	18-HARDING	23-DEDACA
4-PARMER	9-LUBBOCK	14-HOCKLEY	19-QUAY	
5-BAILEY	10-SHERMAN	15-OLDHAM	20-CURRY	

CTO14B
18 MAY 1981

TABLE 4 1-11 BASE ASSEMBLY + CHECKOUT EMPLOYMENT - RESIDENCE ALLOCATION MATRIX, TEXAS/NEW MEXICO (PERCENT)

COUNTY OF EMPLOYMENT	COUNTY OF RESIDENCE																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	15	65	0	0	0	0	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0
20	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	20	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100

COUNTY KEY

1-DALLAM	6-COCHRAN	11-SWISHER	16- ASTRO	21-ROOSEVELT
2-HARTLEY	7-MOORE	12-LAMB	17-UNION	22-CHAVES
3-DEAF SMITH	8-POTTER/RANDALL	13-HALE	18-HARDING	23-DEBACA
4-PARMER	9-LUBBOCK	14-HOCKLEY	19-QUAY	
5-BAILEY	10-SHERMAN	15-OLDHAM	20-CURRY	

C10147
18 MAY 1981

TABLE 4 1-12 MILITARY OPERATIONS EMPLOYMENT - RESIDENCE ALLOCATION MATRIX, TEXAS/NEW MEXICO (PERCENT)

COUNTY OF EMPLOYMENT	COUNTY OF RESIDENCE																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	10	85	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	-	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	90	10	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100

COUNTY KEY

1-DALLAM	6-COCHRAN	11-SWISHER	16-CASTRO	21-ROOSEVELT
2-HARTLEY	7-MOORE	12-LAMB	17-UNION	22-CHAVES
3-DEAF SMITH	8-POTTER/RANDALL	13-HALE	18-HARDING	23-DEBACA
4-PARMER	9-LUBBOCK	14-HOCKLEY	19-QUAY	
5-BAILEY	10-SHERMAN	15-OLDHAM	20-CURRY	

CTP150
18 MAY 1981

TABLE 4 1-13 CIVILIAN OPERATIONS EMPLOYMENT - RESIDENCE ALLOCATION MATRIX, TEXAS/NEW MEXICO (PERCENT)

COUNTY OF EMPLOYMENT	COUNTY OF RESIDENCE																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	40	40	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	40	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100

COUNTY KEY

1-DALLAM	6-COCHRAN	11-SWISHER	16-CASTRO	21-ROOSEVELT
2-HARTLEY	7-MOORE	12-LAMB	17-UNION	22-CHAVES
3-DEAF SMITH	8-POTTER/RANDALL	13-HALE	18-HARDING	23-DEBACA
4-PARMER	9-LUBBOCK	14-HOCKLEY	19-QUAY	
5-BAILEY	10-SHERMAN	15-OLDHAM	20-CURRY	

CTO151
18 MAY 1981

TABLE 4 1-14 INDIRECT EMPLOYMENT - RESIDENCE ALLOCATION MATRIX, TEXAS/NEW MEXICO (PERCENT)

COUNTY OF EMPLOYMENT	COUNTY OF RESIDENCE																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100

COUNTY KEY

1 DALLAM	6-COCHRAN	11 SWISHER	16-CASTRO	21-ROOSEVELT
2-HARTLEY	7-MOORE	12 LAMB	17-UNION	22-CHAVES
3-DEAF SMITH	8-POTTER/RANDALL	13-HALE	18-HARDING	23-DEBACA
4-PARMER	9-LUBBOCK	14-HOCKLEY	19-QUAY	
5-BAILEY	10-SHERMAN	15-OLDHAM	20-CURRY	

CTO152
18 MAY 1981

may occur, available data are insufficient to estimate the potential patterns in such commuting. As a result, any cross-country commuting which occurs is assumed to be offset by commuting in opposite directions. The matrices for indirect workers therefore contain entries of 100 percent on the diagonal and zero elsewhere.

The maps presented as Figures 2.1-1 through 2.1-4 show the geographical relationship among project activity centers (DDA camps and OBs) and ROI county boundaries, communities, and significant transportation routes. These maps provide a basis for interpreting the assumptions implicit in Tables 4.1-1 through 4.1-14. Distances, ease of access, and community population determine the commuting patterns shown in the tables.

Figure 4.1-1 provides an example of the factors influencing the employment-residence allocation assumptions for a representative project activity center - camp 8 for Texas/New Mexico full deployment. A 50 mi commuting radius is used to determine the place of residence of construction and A & CO workers at the camp. The camp is located in Castro Country, Texas, near the Castro County - Randall County border. Because 50 percent of the in-migrant workers are assumed to be unaccompanied by dependents and living at the camp, at least 50 percent of these workers would live as well as work in Castro County. An additional 5 percent of the workers (living outside the camp) are assumed to live elsewhere in the county - probably in Dimmit, with a 1980 population of about 5,000 persons. The proximity of the Amarillo area implies that a large fraction of workers at the camp is likely to commute from Potter/Randall counties. A figure of 30 percent is assumed here. The relatively short distance to Hereford, with a 1980 population of more than 15,000 persons, underlies the assumption of 10 percent of the camp's work-force commuting from Deaf Smith County. Swisher County--primarily the community of Tulia, with a 1980 population of about 5,000 persons--is close enough to the camp that the remaining 5 percent of the camp's workers are assumed to commute from Swisher County.

4.2 AVAILABLE RESIDENT LABOR FORCE

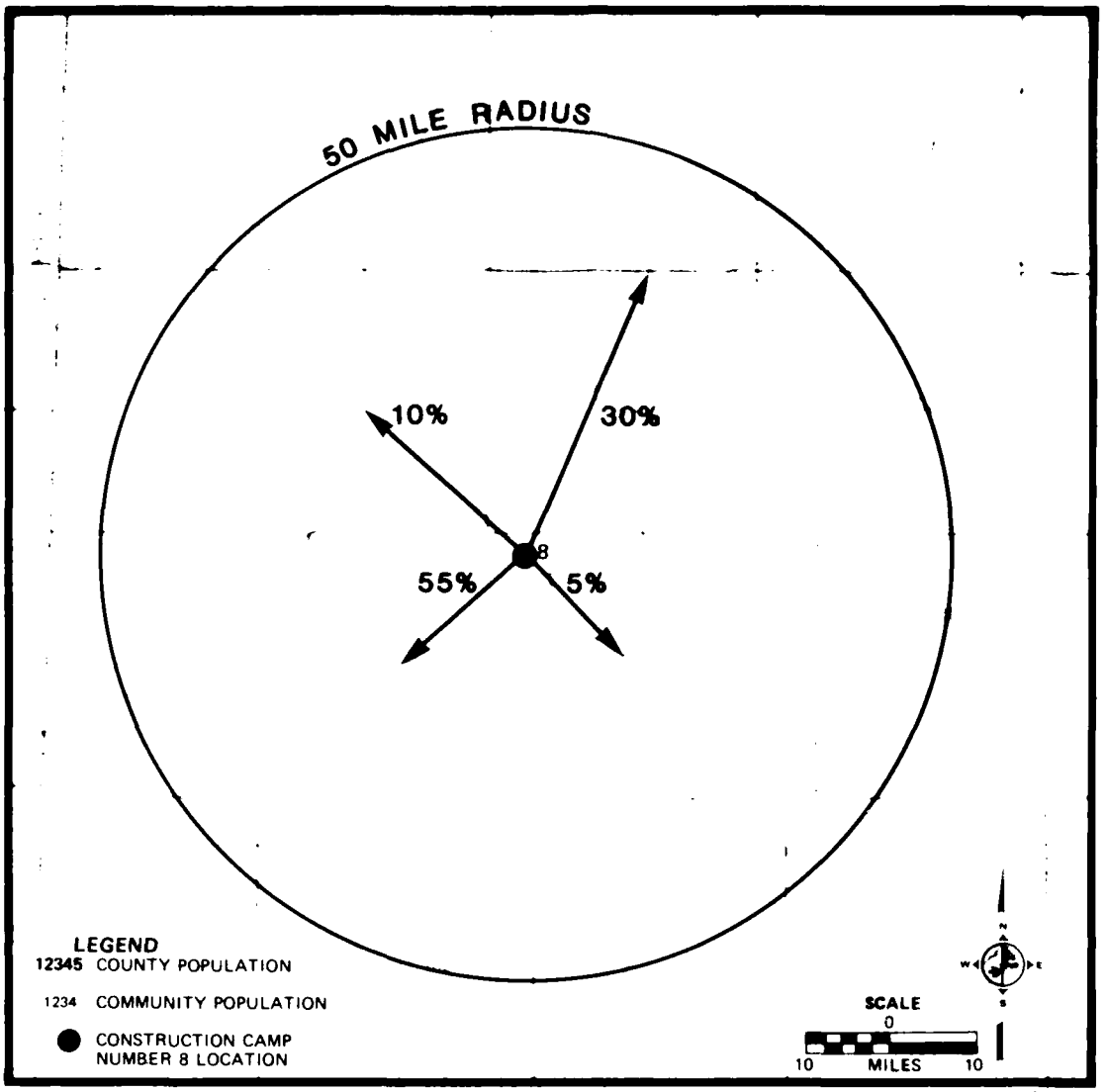
The available resident labor force is defined as the projected baseline unemployed labor force, less an estimate of that portion of the labor force which probably would remain unemployed even under extremely tight labor market conditions. The size of the available resident labor force depends on baseline projections of area population, labor force, and unemployment.

POPULATION

For Utah, baseline projections of population are those provided by the University of Utah's Bureau of Economic and Business Research. For Nevada, the projections are from the State Planning Coordinator's Office. Two baselines are used for Nevada/Utah - (1) a trend-growth baseline, and (2) a baseline with adjustments for several large projects with significant probability of occurrence in the study region. See Chapter 3 of the EIS for specific baseline assumptions.

Washington County, Utah, baseline projections are those of the Utah State Planning Coordinator's Office (January 1980).

Texas county population projections are taken from the Texas State Water Board, while the New Mexico projections are from the Bureau of Business and



Source: HDR Sciences, based on data from U.S. Bureau of the Census and U.S. Geological Survey.

Figure 4.1-1. Employment-residence allocation assumptions for Camp 8, full deployment in Texas/New Mexico.

Economic Research, University of New Mexico. Tables 4.2-1 through 4.2-3 present the 4-state population projections.

A "high-growth" baseline also was developed for the Texas/New Mexico region, but differed only slightly from the projections shown in Table 4.2-3. ETR-44, "Regional Economic Analysis," presents these results. Differences were not sufficient to merit a full regional analysis of the two baselines.

LABOR FORCE

Labor force projections for all counties analyzed in this study are based on projected crude labor force participation rates and the baseline population projections. The historical data from which these calculations were made are presented in ETR-44. The labor force participation rate for each county is projected at its average value over the period 1975-80. No adjustments are made to participation rates for increased employment opportunities related to the M-X system due to the inadequacy of data to estimate this effect. Tables 4.2-4 and 4.2-5 display these projections. To the extent that local labor force participation rates increase as a result of M-X, the in-migration estimates produced in this analysis will be high. Since it is not feasible to eliminate this source of possible bias, the assumptions implying larger in-migration impacts are used in this study.

EMPLOYMENT AND UNEMPLOYMENT

Rates of unemployment for most of the counties included in this analysis are projected at their average values during the period 1975-80. ETR-44 presents the historical data from which these calculations were made. These projections are displayed in Tables 4.2-6 and 4.2-7.

Six years of data (1975-80) represent a relatively short historical period from which to project unemployment rates through 1994. Nevertheless, it is the best available approach which can systematically be applied to the many counties included in this analysis. The years chosen include at the national level, a major recession (1975), a period of significant expansion and employment growth (1976-78), and two years of relative stagnation (1979-80). The economic fluctuations likely to occur throughout the 1980s consequently are represented in the six-year period chosen.

In addition, significant changes in labor force participation and unemployment levels have occurred during the 1970s, in large measure due to long-term changes in the age and sex composition of the labor force. Recent data reflect these changes, while data from the 1960s and early 1970s do not. Using averages over a longer period of time would give excessive weight to years which preceded these changes, and could underestimate participation and unemployment rates. While recent events in rural study-area counties may not closely correspond with these national-level trends, similarities are more pronounced for the metropolitan areas included in this analysis.

Exceptions were made to this approach for two counties--Clark County and White Pine County, Nevada. Projections of the Clark County economy foresee unemployment at the 1975-80 level of 7.7 percent through 1990, with a slight decline to 6.7 percent by 1995 (Clark County Board of Commissioners, Clark County

TABLE 4.2-1. BASELINE POPULATION PROJECTIONS

TREND GROWTH BASELINE
NEVADA/UTAH

COUNTY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
BEAVER	4658	4778	4911	5051	5115	5161	5207	5254	5297	5357	5417	5471	5516
CLARK	495378	512955	531154	550000	571110	593040	615800	639450	663990	683250	703050	723440	744410
EUREKA	1231	1254	1278	1302	1320	1340	1370	1390	1420	1440	1460	1490	1510
IRON	18410	18993	19649	20348	20861	21346	21851	22369	22895	23314	23747	24164	24556
JUAB	5995	6265	6563	6888	7044	7190	7345	7496	7650	7764	7877	7983	8077
LINCOLN	3922	4040	4161	4286	4410	4540	4680	4820	4960	5110	5270	5420	5590
MILLARD	9608	10013	10458	10940	11192	11432	11682	11931	12179	12285	12378	12463	12528
NYE	9772	10110	10448	10786	11100	11430	11760	12110	12470	12790	13110	13450	13790
SALT LAKE/UTAH	876056	907980	942941	980701	1001845	1020860	1040976	1060249	1079131	1096781	1114088	1130135	1144685
WASHINGTON	24046	25055	26105	27200	27948	28716	29505	30317	31150	31793	32449	33119	33802
WHITE PINE	8205	8216	8227	8237	8240	8250	8260	8280	8290	8300	8310	8320	8330
DEPLOYMENT REGION	1457281	1509659	1565895	1625739	1670185	1713305	1758436	1803666	1849432	1888184	1927156	1965455	2002794

19 MAY 1981

CT0131-1

TABLE 4.2-2 BASELINE POPULATION PROJECTIONS

HIGH GROWTH BASELINE
NEVADA/UTAH

COUNTY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
BEAVER	6548	8663	9835	10993	11983	10023	9715	9814	9965	10130	10291	10455	10566
CLARK	495582	513311	531698	550973	572244	594187	616853	640316	664735	684035	703867	724292	745296
EUREKA	1231	1255	1278	1302	1321	1341	1370	1390	1420	1440	1461	1490	1510
IRON	18448	19066	19753	20500	21033	21497	21991	22493	23006	23427	23864	24281	24677
JUAB	6536	7699	8535	9274	9276	9430	9330	8954	8364	8494	8623	8746	8849
LINCOLN	3922	4042	4163	4292	4416	4546	4686	4825	4965	5113	5274	5425	5595
MILLARD	11899	12671	15842	18746	18489	18875	18347	16140	14920	15067	15234	15379	15504
NYE	9772	10111	10450	10791	11108	11437	11766	12115	12473	12796	13116	13456	13795
SALT LAKE/UTAH	877477	910480	946894	987123	1008958	1028068	1047560	1065451	1083344	1101213	1118719	1134918	1149699
WASHINGTON	24046	25055	26105	27200	27948	28716	29505	30317	31150	31793	32449	33119	33802
WHITE PINE	8207	8221	8451	12582	14169	16031	15299	13711	12647	12771	12919	13014	13142
DEPLOYMENT REGION	1463668	1520574	1583004	1653776	1700945	1744151	1786422	1825526	1866989	1906279	1945817	1984575	2022435

19 MAY 1981

CT0132-1

TABLE 4 2-3 BASELINE POPULATION PROJECTIONS
TREND GROWTH BASELINE
TEXAS/NEW MEXICO

COUNTY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
BAILEY	8330	8350	8370	8400	8410	8430	8450	8470	8490	8500	8500	8500	8500
CASTRO	11110	11170	11230	11300	11350	11410	11470	11530	11600	11650	11710	11770	11830
CHAVES	53470	54330	55210	56100	56890	57700	58520	59350	60190	60940	61690	62450	63220
COCHRAN	5200	5200	5200	5200	5200	5200	5200	5200	5200	5230	5270	5310	5350
CURRY	43870	44010	44150	44290	44310	44330	44350	44370	44400	44310	44230	44150	44070
DALLAM	6850	6930	7010	7100	7170	7250	7330	7410	7500	7610	7730	7850	7970
DEAF SMITH	21190	21390	21590	21800	21990	22190	22390	22590	22790	23010	23230	23450	23670
DE BACA	2600	2600	2600	2600	2570	2550	2530	2510	2500	2500	2500	2500	2500
HALE	38080	38480	38890	39300	39710	40120	40540	40970	41390	41920	42450	42990	43540
HARDING	1050	1030	1010	1000	970	950	930	910	890	850	810	770	730
HARTLEY	3650	3730	3810	3890	3970	4050	4130	4210	4290	4370	4450	4530	4610
HOCKLEY	21970	22110	22250	22400	22550	22710	22870	23030	23200	23330	23470	23610	23750
LAMB	17650	17630	17610	17600	17600	17600	17600	17600	17600	17570	17550	17530	17510
LUBBOCK	220240	223380	226570	229790	232410	235060	237740	240450	243190	245950	248740	251560	254410
MOORE	14610	14670	14730	14800	14870	14950	15030	15110	15190	15290	15390	15490	15590
OLDHAM	2730	2750	2770	2790	2830	2870	2910	2950	3000	3050	3110	3170	3230
PARMER	10300	10300	10300	10300	10310	10330	10350	10370	10400	10470	10550	10630	10710
POTTER/RANDALL	166600	168640	170710	172800	174810	176840	178900	180990	183100	185300	187530	189790	192080
QUAY	11230	11250	11270	11290	11270	11250	11230	11210	11200	11150	11110	11070	11030
ROOSEVELT	16610	16670	16730	16800	16870	16950	17030	17110	17200	17270	17350	17430	17510
SHERMAN	3830	3850	3870	3890	3910	3930	3950	3970	4000	4030	4070	4110	4150
SWISHER	10570	10610	10650	10700	10770	10850	10930	11010	11090	11210	11330	11450	11570
UNION	4850	4830	4810	4800	4810	4830	4850	4870	4900	4900	4900	4900	4900
DEPLOYMENT REGION	696520	709310	722340	735630	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

TABLE 4.2-4. BASELINE LABOR FORCE PARTICIPATION RATE PROJECTIONS

(PERCENT)
NEVADA/UTAH

COUNTY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
BEAVER	44.8	44.8	44.8	44.8	44.8	44.8	44.8	44.8	44.8	44.8	44.8	44.8	44.8
CLARK	47.8	47.8	47.8	47.8	47.8	47.8	47.8	47.8	47.8	47.8	47.8	47.8	47.8
EUREKA	54.2	54.2	54.2	54.2	54.2	54.2	54.2	54.2	54.2	54.2	54.2	54.2	54.2
IRON	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0
JUAB	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5
LINCOLN	45.5	45.5	45.5	45.5	45.5	45.5	45.5	45.5	45.5	45.5	45.5	45.5	45.5
MILLARD	40.3	40.3	40.3	40.3	40.3	40.3	40.3	40.3	40.3	40.3	40.3	40.3	40.3
NYE	30.7	30.7	30.7	30.7	30.7	30.7	30.7	30.7	30.7	30.7	30.7	30.7	30.7
SALT LAKE/UTAH	45.8	45.8	45.8	45.8	45.8	45.8	45.8	45.8	45.8	45.8	45.8	45.8	45.8
WASHINGTON	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7	37.7
WHITE PINE	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
DEPLOYMENT REGION	46.1	46.1	46.1	46.1	46.1	46.1	46.1	46.1	46.1	46.1	46.2	46.2	46.2

19 MAY 1981

CTO133-1

TABLE 4 2-5 BASELINE LABOR FORCE PARTICIPATION RATE PROJECTIONS
(PERCENT)
TEXAS/NEW MEXICO

COUNTY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
BAILEY	42 2	42 2	42 2	42 2	42 2	42 2	42 2	42 2	42 2	42 2	42 2	42 2	42 2
CASTRO	37 5	37 5	37 5	37 5	37 5	37 5	37 5	37 5	37 5	37 5	37 5	37 5	37 5
CHAVES	39 4	39 4	39 4	39 4	39 4	39 4	39 4	39 4	39 4	39 4	39 4	39 4	39 4
COCHRAN	41 0	41 0	41 0	41 0	41 0	41 0	41 0	41 0	41 0	41 0	41 0	41 0	41 0
CURRY	34 9	34 9	34 9	34 9	34 9	34 9	34 9	34 9	34 9	34 9	34 9	34 9	34 9
DALLAM	35 5	35 5	35 5	35 5	35 5	35 5	35 5	35 5	35 5	35 5	35 5	35 5	35 5
DEAF SMITH	41 9	41 9	41 9	41 9	41 9	41 9	41 9	41 9	41 9	41 9	41 9	41 9	41 9
DE BACA	39 8	39 8	39 8	39 8	39 8	39 8	39 8	39 8	39 8	39 8	39 8	39 8	39 8
HALE	43 0	43 0	43 0	43 0	43 0	43 0	43 0	43 0	43 0	43 0	43 0	43 0	43 0
HARDING	52 8	52 8	52 8	52 8	52 8	52 8	52 8	52 8	52 8	52 8	52 8	52 8	52 8
HARTLEY	32 6	32 6	32 6	32 6	32 6	32 6	32 6	32 6	32 6	32 6	32 6	32 6	32 6
HOCKLEY	42 3	42 3	42 3	42 3	42 3	42 3	42 3	42 3	42 3	42 3	42 3	42 3	42 3
LAMB	41 9	41 9	41 9	41 9	41 9	41 9	41 9	41 9	41 9	41 9	41 9	41 9	41 9
LUBBOCK	47 0	47 0	47 0	47 0	47 0	47 0	47 0	47 0	47 0	47 0	47 0	47 0	47 0
MOORE	46 8	46 8	46 8	46 8	46 8	46 8	46 8	46 8	46 8	46 8	46 8	46 8	46 8
OLDHAM	32 3	32 3	32 3	32 3	32 3	32 3	32 3	32 3	32 3	32 3	32 3	32 3	32 3
PARMER	42 5	42 5	42 5	42 5	42 5	42 5	42 5	42 5	42 5	42 5	42 5	42 5	42 5
POTTER/RANDALL	51 3	51 3	51 3	51 3	51 3	51 3	51 3	51 3	51 3	51 3	51 3	51 3	51 3
QUAY	45 9	45 9	45 9	45 9	45 9	45 9	45 9	45 9	45 9	45 9	45 9	45 9	45 9
ROOSEVELT	43 0	43 0	43 0	43 0	43 0	43 0	43 0	43 0	43 0	43 0	43 0	43 0	43 0
SHERMAN	42 1	42 1	42 1	42 1	42 1	42 1	42 1	42 1	42 1	42 1	42 1	42 1	42 1
SWISHER	44 1	44 1	44 1	44 1	44 1	44 1	44 1	44 1	44 1	44 1	44 1	44 1	44 1
UNION	45 8	45 8	45 8	45 8	45 8	45 8	45 8	45 8	45 8	45 8	45 8	45 8	45 8
DEPLOYMENT REGION	45 3	45 3	45 3	45 3	45 3	45 3	45 3	45 3	45 3	45 3	45 3	45 4	45 4

TABLE 4.2-6 BASELINE UNEMPLOYMENT RATE PROJECTIONS

(PERCENT)
NEVADA/UTAH

COUNTY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
BEAVER	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
CLARK	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.5	7.3	7.1	6.9
EUREKA	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
IRON	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9
JUAB	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
LINCOLN	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
MILLARD	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
NYE	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9
SALT LAKE/UTAH	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
WASHINGTON	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
WHITE PINE	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1
DEPLOYMENT REGION	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.2	6.1	6.0	6.0	5.9

19 MAY 1981 CT0134-1

TABLE 4.2-7 BASELINE UNEMPLOYMENT RATE PROJECTIONS
(PERCENT)
TEXAS/NEW MEXICO

COUNTY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
BAILEY	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
CASTRO	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
CHAVES	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
COCHRAN	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
CURRY	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
DALLAM	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
DEAF SMITH	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
DE BACA	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
HALE	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
HARDING	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
HARTLEY	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
HOCKLEY	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
LAMB	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
LUBBOCK	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
MOORE	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
OLDHAM	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
PARMER	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
POTTER/RANDALL	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
QUAY	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8
ROOSEVELT	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9
SHERMAN	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
SWISHER	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
UNION	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
DEPLOYMENT REGION	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1

208 Water Quality Management Plan, Growth Forecasts, Environmental Report No. 3, November 1977, p. 46). These projections are incorporated in this analysis. In White Pine County in 1976, unemployment reached 23.5 percent of the labor force, a rate twice as high as any recorded on an annual basis for any other year since 1968. Because of the relatively low probability that such a high rate will recur in the future, 1976 was excluded from the White Pine County calculations, and the average of 9.1 percent for 1974-80 (excluding 1976) was used. Tables 4.2-6 and 4.2-7 reflect these assumptions.

Baseline projections of labor force participation and unemployment rates jointly determine projected employment at the county level, since the projected labor force (population times the participation rate) minus unemployment (unemployment rate times the labor force) leaves employment as a residual. This analysis consequently uses baseline projections of the labor force concept of employment by place of residence.

The size of the local labor force, the local unemployment rate, and the sensitivity of labor force in-migration to changes in the local unemployment rate are key determinants of the extent of labor force in-migration for any given amount of employment change. This analysis relies on an "unemployed labor pool" concept of local labor supply. The projected number of unemployed persons in the local labor force is assumed to be available for M-X-related employment. As the local unemployment rate declines because of project employment, additional workers are likely to in-migrate in response to this labor market tightening. Such in-migration is likely to occur well before the local unemployment rate is driven to zero. While empirical evidence on the responsiveness of labor force in-migration to regional differences in unemployment rates is quite sketchy, it is reasonable to assume that local unemployment rates in the range of 3-7 percent (while national unemployment averages 6-8 percent) are likely to trigger labor force in-migration. Such local labor market tightness also is likely to increase local labor force participation as otherwise "discouraged" workers enter the labor force in response to increased employment opportunities. In addition, it is reasonable to presume that the rate of unemployment which triggers labor force in-migration would vary from one locality to another because of differences in the general attractiveness of areas, their economic and demographic characteristics, and other factors.

This analysis assumes that the unemployment rate may decline 3 percentage points from its baseline level--but in no case below 4 percent of the labor force--without triggering in-migration. Clark County, Nevada, because of historically high unemployment rates combined with very rapid job growth, is treated as a special case. The unemployment rate "floor" in Clark County is assumed to be 6 percent. This formulation permits the "trigger" rate of unemployment to vary from one area to another, while setting an overall floor. Higher "trigger" rates certainly are possible, but were not used in this analysis because of the assumption of a constant labor force participation rate. Since in reality, participation rates are likely to rise with employment, to establish too high a floor on the local unemployment rate would over-estimate labor force in-migration. In addition, the possibility of multiple job-holding--quite common in rural areas--further reduces the extent of labor force in-migration for a given level of job creation. Because no multiple job-holding is assumed to take place in this analysis, the assumption of a floor "trigger" rate at the lower end of the 3-7 percent plausible range is most appropriate. This approach is consistent with that of the Bureau of Economic and Business Research,

University of Utah, in evaluating the economic and demographic impacts of M-X deployment in the Great Basin (see Bureau of Economic and Business Research, University of Utah, Refinement of Broad Area Impacts of M-X Missile Deployment on Nevada and Utah and Preliminary Allocation of Impacts to Community Group Level, August 13, 1980, pp. A5-53, A5-54, and Appendices).

The result of this formulation of the local labor supply is that counties with baseline unemployment rates of less than 4 percent would experience labor force in-migration to fill each new job created as a result of M-X deployment. In counties such as White Pine County, Nevada, the baseline unemployment rate would fall 3 percentage points (for example, to 6.1 percent) before additional workers would in-migrate. In Salt Lake/Utah counties, just over 1 percent of the baseline labor force would be employed before in-migration would occur. Labor force and population impacts on Clark County, Nevada, and Curry County, New Mexico are particularly sensitive to this "trigger rate" assumption, since both have relatively large baseline labor forces and high baseline unemployment rates.

Because of the probable occupational characteristics of these unemployed persons, 30 percent of the available resident labor force is assumed to be employable in project construction, 20 percent is assumed employable in project operations, and the remaining 50 percent is assumed indirectly employable as a result of M-X. This disaggregation applies to the available resident labor force as a whole, not to specific individuals within it. These estimates are somewhat uncertain because data on the occupational characteristics of the unemployed are difficult to interpret. In the case of construction, the assumption that 30 percent of the available resident labor force is employable on the project is consistent with the large share of less skilled labor in total project construction personnel requirements. It also is consistent with the 29 percent share of more manual occupations - farming/fishing/forestry, machine trades, bench work, and structural work - in total ensured unemployment in the second quarter of 1978 in a major study region SMSA (Las Vegas, Nevada).

4.3 REGIONAL EXCESS LABOR DEMAND AND IN-MIGRATION

The small local economies within the deployment region have relatively small population and consequently limited indigenous labor supply potential compared to the labor demands of the M-X system. The communities most affected by M-X deployment therefore would experience at least temporary excess demand for labor for construction, operation, and indirect employment. This in turn would lead to labor force in-migration.

Excess labor demand is estimated in three categories: construction, operation, and indirect employment. These distinctions are based on the assumption that different occupational characteristics will be required in each category.

Labor force in-migration is determined by excess labor demand by category--construction, operations, and indirect employment--with adjustments for the labor force participation and unemployment characteristics of the in-migrants. Analytically, the local labor force is assumed to fill project-related jobs as these opportunities arise. When the available resident labor force by category is employed, labor force in-migration is assumed to occur. Many of the dependents of labor force in-migrants are assumed to be indirectly employable as a result of the

project, and these dependents would fill any additional indirect employment opportunities which may exist. Remaining jobs indirectly resulting from the project after the available resident labor force and the secondary in-migrant labor force are employed would then prompt additional labor force in-migration. Some of the workers in the secondary labor force are assumed to remain unemployed even under strong labor demand conditions.

Because of the possibility of frictional unemployment or turnover of the in-migrant labor force, in-migration of construction workers would exceed the excess demand for construction labor. For example, an excess demand for construction labor of 92 persons would imply in-migration of 100 construction workers given an assumption of 8 percent unemployment among construction workers.

Table 4.3-1 summarizes the parameter assumptions used in the analysis regarding the labor force and demographic characteristics of the potential in-migrant population. These assumptions relate to household size, the fraction of in-migrants with families, labor force participation rates, and unemployment rates. Each of these parameters is disaggregated by type of in-migrant, and assigned the values shown in the table. These assumptions jointly determine the level of labor force and population in-migration associated with any given level of local excess labor demand.

MARITAL STATUS AND HOUSEHOLD SIZE

Average family size for military personnel with families is assumed to be 3.4 persons, or 2.4 dependents per member of the military. This is based on FY1980 data for Air Force families (see Department of Defense Selected Manpower Statistics, FY1980, Directorate of Information, Operations, and Reports, Washington, D.C., 1980, Table 2-6, p. 70). Sixty-five percent of all military personnel are assumed to be married, which is roughly consistent with a weighted average of 81.9 percent for officers and 62.1 percent for enlisted personnel. This average figure also is within the range of 63.6-69.7 percent observed on Ellsworth, Malmstrom, Whiteman, Grand Forks, and Holloman Air Force Bases (see U.S. Air Force, TAB A-1 Environmental Narratives for bases listed).

The fraction of construction personnel with families in the region is assumed to be 50.0 percent. This value is based on the findings of the Construction Worker Profile prepared for the Old West Regional Commission in 1975. The commission's survey of construction workers employed on large energy-development projects in the Rocky Mountain states found that 48.9 percent of the workers were married with their families present. The remaining 51.1 percent were either single or married without families present. This analysis treats the latter two categories identically -- that is, no distinctions are made between workers who are married but without their families present and workers who are single. The 50.0 percent of construction workers with families are assumed to have an average family size of 3.6 persons - 2.6 dependents per worker. This estimate again is based on the Construction Workers Profile findings of 3.61 persons per household.

The average household size for other civilian in-migrants is assumed to be 2.80 persons. This estimate is based on the findings of the U.S. Bureau of the Census for the United States in 1978. It assumes that 74.9 percent of these persons are married with an average family size of 3.33, while the remaining 25.1 percent are single.

Table 4.3-1. In-migrant labor force and demographic assumptions.

Variable	Value
Household size, construction workers with families	3.60
Household size, assembly and checkout workers with families	3.60
Household size, military with families	3.40
Household size, civilian in-migrants (average, with and without families)	2.80
Fraction of military personnel with families	0.65
Fraction of construction personnel with families	0.50
Fraction of assembly and checkout workers with families	0.50
Labor force participation rate, military dependents	0.29
Labor force participation rate, construction worker dependents	0.24
Labor force participation rate, civilian operation dependents	0.29
Labor force participation rate, assembly and checkout dependents	0.24
Labor force participation rate, other civilian in-migrant dependents	0.33
Unemployment rate, construction workers	0.08
Unemployment rate, military dependents	0.13
Unemployment rate, construction worker dependents	0.09
Unemployment rate, assembly and checkout dependents	0.09
Unemployment rate, civilian operation dependents	0.09
Unemployment rate, other civilin in-migrants dependents	0.09

[3978/9-28-81

Sources: U.S. Department of Defense; U.S. bureau of the Census; U.S. Bureau of Labor Statistics; Old West Regional Commission; and Chase Econometric Associates, Inc. See text.

LABOR FORCE PARTICIPATION RATES

Dependents of military personnel are presumed to have an average labor force participation rate of 29 percent. This value is based on the assumption that the representative military family household of 3.4 persons is composed of a male Air Force officer or airman, his wife, and 1.4 children. For those family households containing female Air Force personnel and male civilian spouses, the tendency for men to show higher average participation rates would imply average dependent participation greater than 29 percent. It is doubtful, however, that this would significantly affect the average for all USAF dependents.

Available data indicate that the average labor force participation rate for all military wives has increased sharply during the decade of the 1970s from 30.5 percent in 1970 to 50.2 percent in 1979 (see A.S. Grossman, "The Employment Situation for Military Wives," Monthly Labor Review, U.S. Department of Labor, February 1981, pp. 60-64). This participation rate is likely to vary depending on the remoteness of the duty station, with employment opportunities reduced in the more remote and sparsely populated areas. Participation rates also are likely to vary depending on the type of assignment the military man takes. Prolonged absence of the husband from home may make it more difficult for wives to bear both family and work responsibilities (see Grossman, pp. 60-61). Conversely, the husband's absence may encourage wives with lighter home responsibilities to work when otherwise they might not, since working would provide more opportunities for companionship.

In the case of M-X, several of the potential base locations are relatively far removed from regional employment centers. The Milford, Beryl, Delta, Ely, and Dalhart base locations are quite far from large centers of economic activity, though substantial expansion of job opportunities because of local base expenditures would be likely. The Coyote Spring and Clovis base locations, on the other hand, are much closer to employment opportunities. At the same time, assignment to the M-X operating bases would not require prolonged separations of military personnel from their families. Absence of the husband consequently would not be a factor in either discouraging or encouraging labor force participation on the part of military wives.

Given the availability of data, therefore, and considering both the potential locations of the bases and the nature of the M-X assignment, it seems most reasonable to assume the most recent average labor force participation rate for all military wives (50 percent) would apply to wives at the M-X bases. This rate may be somewhat lower at the more remote base locations and somewhat higher at Coyote Spring and Clovis, though no information is available to indicate how much of a variation around this average is probable.

Teenage dependents constitute the other component of the additional labor force in-migrating with the military personnel. Probable teenage labor force participation can be inferred from available 1979 labor force and population data. In the United States in 1979, 9,512 thousand persons 16-19 years of age were in the labor force (consisting of 4,236 thousand employed males, 3,748 thousand employed females, 795 thousand unemployed males, and 733 thousand unemployed females. See U.S. Bureau of Labor Statistics, cited in Council of Economic Advisors, Economic Report of the President, Washington, D.C., January 1981, p. 266). The U.S. population ages 16-19 in 1979 consisted of 16,838 thousand persons, while

population 0-19 in 1979 totalled 71,130 thousand persons (U.S. Bureau of the Census, cited in Economic Report of the President, p. 263). Assuming no significant labor force participation prior to age 16, these data imply a participation rate among all persons 19 and under of 13.4 percent (9,512/71,130).

In terms of the 2.4 dependents in the representative military household used in this analysis, 50.0 percent labor force participation on the part of military wives implies an average 0.50 participants among the 2.4 dependents. In addition, 13.4 percent participation on the part of the 1.4 minor dependents implies an average 0.19 minor participants per household (0.134x1.4). For military dependents, therefore, an average participation rate of 29 percent (based on 0.50 wives and 0.19 minor participants per 2.4 dependents in the household, or 0.69/2.4 = 0.29) is used in this analysis.

The labor force participation rate among construction worker dependents is assumed to average 24 percent. This assumption is based primarily on results reported in the Construction Worker Profile. For newcomer construction dependents, the Profile reports a ratio of employed dependents to dependent population of 21.5 percent. If, in addition, 9 percent of the construction worker dependent labor force is unemployed (see below) the labor force participation rate for this group can be calculated as follows:

let E = number of employed persons,

U = number of unemployed persons, and
POP = population.

Then, by definition, the labor force is equal to employment plus unemployment, and the labor force participation rate is the ratio of labor force to population. This can be written algebraically as:

$$(E + U)/POP = E/POP + U/POP.$$

The Construction Worker Profile results imply that:

$$E/POP = 0.215.$$

The assumption of 9 percent unemployment among construction worker dependents can be written as:

$$U/(E + U) = 0.09.$$

If both sides of this equation are multiplied by $(E + U/POP$.

$$(U/E + U))((E + U)/POP) = 0.09\ (E + U)/POP.$$

Now, cancel the $(E + U)$ terms on the lefthand side and rearrange terms on the righthand side to obtain:

$$U/POP = 0.09\ (E/POP) + 0.09\ (U/POP).$$

From the Construction Worker Profile, E/POP = 0.215, so,

$$(U/POP)(1 - 0.09) = (0.09)(0.215).$$

Therefore,

$$U/POP = (0.09)(0.215)/(1 - 0.09) = 0.021,$$

and

$$(E + U)/POP = E/POP + U/POP = 0.215 + 0.021 = 0.236.$$

Assembly and checkout worker dependents are assumed to have the same average participation rate as construction worker dependents--24 percent. Little data are available from which to infer the probable characteristics of this group of in-migrants. Because the living and working conditions of assembly and checkout workers would correspond most closely to those of construction workers, however, the participation characteristics of their dependents are assumed to be the same as those of construction worker dependents.

Civilian operations in-migrant dependents are assumed to have the same labor force participation rate as military dependents--29 percent. This assumption is based on recent data which indicate that civilian wives and military wives have virtually the same average labor force participation rates (see Grossman, p. 60). In 1979, military wives had an average participation rate of 50.2 percent, while the rate for civilian wives was 49.4 percent. If the average number of dependents per civilian family household is 2.33 and the participation rate among minor dependents is 13.4 percent (see above), the average participation rate among civilian operations dependents would be 29 percent.

The labor force participation rate among other civilian in-migrant dependents--families of workers in-migrating to take jobs indirectly related to M-X--is assumed to average 33 percent. As with construction worker dependents, this value is based on the findings of the Construction Worker Profile. Among "other newcomer dependents," the Profile reports that 30.2 percent were employed. If unemployment averages 9 percent among this group (see below), calculations similar to those performed for construction worker dependents imply an average participation rate of 33 percent:

$$U/POP = (0.09)(0.302)(1 - 0.09) = 0.030$$

$$(E + U)/POP = 0.302 + 0.030 = 0.332.$$

UNEMPLOYMENT RATES

Of those military dependents in the labor force, 13 percent are assumed to be unemployed. This value is based on a disaggregation of the military dependent labor force into wives and teenagers. Since 1970, the unemployment rate among military wives has on the average been about twice that of civilian wives. In 1979, military wives experienced an unemployment rate of 12 percent, while only 5 percent of civilian married women in the labor force were unemployed (see Grossman, 6.62). The unemployment rate among civilian married women since 1970 has tended to

correspond very closely to the unemployment rate for the entire civilian labor force. Chase Econometrics Associates, Inc., projects the U.S. unemployment rate during the period 1985-90 to be in the range of 5.5 - 6.0 percent (Chase Econometrics Associates, Inc., Long-term Standard Trend Forecast of January 14, 1981, p.17). For the Rocky Mountain states, long-term unemployment is projected to be somewhat lower--5.0 percent or less by 1990 (Chase Econometric Associates, Inc. Long-term Regional Forecast, First Quarter, 1981). This assumption of a tendency toward high employment is generally accepted in long-term state and national level forecasting. If the historical relationship among civilian wives' unemployment, military wives' unemployment, and average unemployment of the labor force is maintained through the projection period of this analysis, the assumption of 12 percent unemployment among military wives seems most reasonable.

Unemployment among teenagers (ages 16-19) in the United States from 1970 to 1980 has fluctuated from 14.5 percent to 19.9 percent, and has averaged 16.9 percent over this 11-year period (see Economic Report of the President, January 1981, p. 267). If teenage unemployment among military dependents is assumed to average 17 percent, and unemployment among military wives is 12 percent, the unemployment rate for all military dependents is a weighted average of the unemployment rates for these two component groups. Since wives represent 0.5 of the 0.69 dependent labor force participants per representative household, while teenagers constitute the remaining 0.19 participants, the weighted average unemployment rate for the two groups combined is 13 percent (12 x 0.5/0.69 + 17 x 0.19/0.69 = 13 percent). Consequently, only 87 percent of the military dependents in the labor force are assumed to be available for employment, while the other 13 percent remain unemployed.

The unemployment rate among construction worker dependents is assumed to average 9 percent. As with military dependents, this value is based on a disaggregation of construction worker dependents into wives and teenage labor force participants. While some women can be expected to find M-X construction jobs, this would not significantly alter the dependent unemployment rate assumptions used in this analysis. If civilian married women have an average unemployment rate similar to the average for the entire labor force (about 5 percent in the long-term, using the Chase Econometric Associates, Inc., regional projections), and teenagers have an unemployment rate of 17 percent, the rate for all construction worker dependents would be a weighted average of these two rates. If a representative construction worker household contains 0.5 wives in the labor force and 0.21 teenagers in the labor force (13.4 percent participation among 1.6 minor dependents), the additional labor force associated with construction worker households would be constituted of 70 percent (0.5/0.71) wives and 30 percent (0.21/0.71) teenagers. Using these proportions to weight the unemployment rates of 5 percent and 17 percent, respectively, yields a weighted average unemployment rate of 9 percent.

Unemployment rates among dependents of assembly and checkout workers, civilian operations workers, and other civilian in-migrants all are assumed to equal the 9 percent unemployment rate among construction worker dependents. This figure represents an average of 5-6 percent unemployment among adult spouses and 17 percent unemployment among teenage dependents. Consequently, only 91 percent of the dependent labor force in these categories are assumed to be employable on the project. Unemployment among these groups would be even higher

if the demand for indirect workers is not sufficient to employ all of this additional labor force.

The probable unemployment rate among construction workers on the M-X system is highly uncertain. Construction workers generally are unemployed at a higher-than-average rate because of the volatility of industry demand, seasonal changes in the weather, and other factors. In 1978-79, when U.S. unemployment averaged 5.8-6.0 percent, construction workers nationwide experienced more than 10 percent unemployment. In 1980, because of the recession, construction industry unemployment was 14.2 percent, twice the U.S. average of 7.1 percent (see Monthly Labor Review, February 1981, p.90, and Economic Report of the President, January 1981, p. 269). Since the M-X project represents an extremely large demand for construction labor in an area much smaller than the entire United States, it is unlikely that construction-worker unemployment rates as high as 1978-80 industry averages would be observed. At the same time, imperfect information about the exact number and location of construction jobs indicates that some workers may move into the region in the expectation of finding employment and these expectations may not be fulfilled. If these disappointed job-seekers remain in the region for a while in the hope of finding a construction job, unemployment among construction workers would be observed.

Taking these considerations into account, it seems likely that construction worker unemployment greater than the projected long-term regionwide average of 5-6 percent but less than U.S. industry-wide averages under non-recession conditions (10 percent) would be observed. An 8 percent unemployment rate near the mid-point of this range is assumed for this analysis.

4.4 SUBCOUNTY ALLOCATION OF IN-MIGRANT POPULATION

This analysis disaggregates county-level estimates of M-X-induced population in-migration into three general places of residence:

- o communities, with no distinction made among communities;
- o operating bases; and
- o construction camps.

The employment and family status of the principal in-migrant wage-earner is used to estimate the place of residence of the worker and his dependents.

CONSTRUCTION EMPLOYMENT

The portion of DDA and OB construction workers assumed to have their families present (see section 4.3) are assumed to live in communities. The remaining construction workers -- single persons and married persons without families present -- are presumed to be basically full-time residents in construction camps. This assumption would not preclude spending some non-work hours in major metropolitan areas on the fringes of the deployment region. In fact, the incomes of these persons are assumed to be spent in a number of communities throughout the region, reflecting a relatively high degree of mobility. In-migrant workers employed in DDA construction and without families are assumed to live in the construction camps shown in Figures 2.1-1 through 2.1-4. In-migrant workers employed in OB construction and without families present are assumed to live in a construction camp established on the site of the base.

ASSEMBLY AND CHECKOUT EMPLOYMENT

Because of the relatively technical nature of assembly and checkout employment, all workers in this category are assumed to be in-migrants. They are assumed to have the same demographic characteristics as construction workers. They are allocated to the construction camps, communities, or base sites in the same proportions as construction workers, depending on the location of their employment and their family status.

MILITARY EMPLOYMENT

Of all the military operations personnel and their dependents, current Air Force plans are that 80 percent would live onbase. The remaining 20 percent are allocated to the communities near the base locations.

CIVILIAN OPERATIONS EMPLOYMENT

All in-migrant civilian operations personnel and their dependents are assumed to live in communities near the bases.

INDIRECT EMPLOYMENT

All in-migrating workers indirectly employed by the M-X project, as well as their dependents, are assumed to live in communities in the ROI.

5.0 MODEL OUTPUTS

The purpose of this section is to provide a brief overview of the outputs of the M-X economic impact model presented in this report.

5.1 IMPACTS BY COUNTY OF EMPLOYMENT

Table 5.1-1 presents the principal outputs of the model on a place-of-employment basis. The table relates, as an example, to Clark County in a year of high project activity, 1987. The percentage of military on-base is assumed to be 80 percent. The alternative analyzed is the Proposed Action, which implies that the first or main operating base would be in Clark County. Because of the size of the Clark County economy, unmodified RIMS multipliers were used. In addition to the base at Coyote Spring, the second operating base (for the Proposed Action) would be located at Milford, in Beaver County, Utah.

Employment impacts on a county-of-employment basis are presented in the first data table in Table 5.1-1. Eight types of employment are considered in the model. These are: DDA construction, DDA assembly and checkout, base construction, base assembly and checkout, operations officers, operations enlisted, operations civilian, and indirect employment. The table presents employment in each of these categories in Clark County for the year and the alternative specified. These employment levels represent only M-X-related employment--not baseline or without-project employment. The table also presents earnings per worker per year for each of these employment categories. This is simply a reprint of the assumptions entered as specified in Section 2 of this report. Total earnings as calculated by the number of workers times average earnings per worker also are presented in the table. Total earnings are $363 million implying an average earnings per worker of almost $16,000 annually. The table presents in addition the crude ex-post employment multiplier implied by the model calculations. For Clark County in this year this multiplier is 2.222. This is calculated as the ratio of total project-related employment or 22,719 jobs, to direct project employment--that is, employment in the first seven categories listed in the table.

The table also indicates that approximately $20 million of local procurement activity would occur within the county, all to support operations personnel at the base.

The bottom portion of the first page of Table 5.1-1 presents local project-related investment for Clark County in 1987 for off-base housing, street facilities, school facilities, other public buildings, utilities, retail buildings, commercial buildings, and industrial buildings. Off-base housing would be the largest single component of this category of investment, representing more than 31 million dollars worth of purchases in 1987 in Clark County. Total project-related investment in the county in 1987 would be $62 million.

The second page of Table 5.1-1 presents a detailed breakdown of indirect employment by source of project-related stimulus. As indicated in the table, significant levels of final demand change would be observed in virtually all of the final demand categories considered in this analysis. Base payroll expenditures in the county would amount to more than 90 million dollars in 1987, while DDA payroll

Table 5.1-1. (Page 1 of 2)

8-JUL-81

REGION CLARK YEAR 1987 PERCENT MILITARY ONBASE 80.0

MAIN BASE IN THIS REGION
UNMODIFIED R I M S MULTIPLIERS USED
BASE IN THIS REGION
PROPOSED ACTION FULL DEPLOYMENT - NEVADA/UTAH
BASE I AT COYOTE SPRING, NV (CLARK CO.)
BASE II AT MILFORD, UT (BEAVER CO.)

IMPACTS BY COUNTY OF EMPLOYMENT

EMPLOYMENT IMPACTS

TYPE OF EMPLOYMENT	EMPLOYMENT	EARNINGS/WKR/YR	TOTAL EARNINGS
SHELTER CONSTRUCTION	0	37110.	0.
SHELTER ASS. & C.O.	200.	25000.	5000000.
BASE CONSTRUCTION	1052.	37110.	39039720.
BASE ASS. & C.O.	1250.	25000.	31250000.
OPERATIONS, MILITARY OFFICERS	610.	25800.	15738000.
OPERATIONS, ENLISTED PERSONNEL	5900.	11400.	67260000.
OPERATIONS, CIVILIANS	1212.	19700.	23876400.
INDIRECT EMPLOYMENT	12495.	14497.	181141632.
TOTAL/AVERAGE	22719.	15991.	363305760.

CRUDE EX POST EMPLOYMENT MULTIPLIER: 2.222

ANNUAL PROCUREMENT SUPPLIED LOCALLY

CONSTRUCTION	0.
OPERATIONS	19567000.
TOTAL	19567000.

LOCAL PROJECT-RELATED INVESTMENT

OFFBASE HOUSING	31492558.
STREET FACILITIES	2960130.
SCHOOL FACILITIES	4881015.
OTHER PUBLIC BUILDINGS	0.
UTILITIES, PUBLIC AND PRIVATE	5806500.
RETAIL BUILDINGS	10065390.
COMMERCIAL BUILDINGS	4674825.
INDUSTRIAL BUILDINGS	2370000.
TOTAL	62250420.

Table 5.1-1. (Page 2 of 2)

COMPOSITION OF INDIRECT EMPLOYMENT

IMPACT	FINAL DEMAND CHANGE	RIMS MULTIPLIER	CURRENT-YEAR GROSS OUTPUT CHANGE	EARNINGS CHANGE	EMPLOYMENT CHANGE
BASE PAYROLL EXPENDITURES	90609000	2.248	181696096.	61994708.	4276.
NON-PAYROLL EXPENDITURES	73316000	2.248	154527680.	52724844.	3637.
MAINTENANCE AND REPAIR OF MIL. FACILITIE	1506659.	2.447	3103019.	1197889.	83.
MOTOR FREIGHT TRANSPORTATION	900082.	2.599	1968530.	769647.	53.
COMMUNICATIONS	606577.	2.353	1201473.	445446.	31.
ELECTRIC SERVICES	2015401.	2.010	3413965.	932411.	64.
GAS PRODUCTION AND DISTRIBUTION	2015401.	2.120	3599029.	835498.	58.
WATER SUPPLY AND SANITARY SERVICES	1995834.	2.131	3582433.	1029348.	71.
WHOLESALE TRADE	1800164.	2.442	3699956.	1350627.	93.
RETAIL TRADE	606577.	2.609	1331709.	527891.	36.
PERSONAL SERVICES	3013318.	2.540	6441102.	2283618.	158.
BUSINESS SERVICES	3013318.	2.736	6936897.	2683126.	185.
PROFESSIONAL SERVICES	2093669.	2.878	5069532.	2077699.	143.
OFFBASE HOUSING	31492558.	2.341	71458296.	24078654.	1661.
STREET FACILITIES	2760130.	2.511	8194428.	2837244.	196.
SCHOOL FACILITIES	4881015.	2.368	12734986.	4075364.	281.
OTHER PUBLIC BUILDINGS	0.	2.444	1547418.	509551.	35.
UTILITIES	5806500.	2.335	12256055.	3985188.	275.
RETAIL BUILDINGS	10065390.	2.345	18973634.	6187778.	427.
COMMERCIAL BUILDINGS	4674825.	2.152	9087144.	2964130.	204.
INDUSTRIAL BUILDINGS	2370000.	1.094	0.	0.	0.
TOTAL/AVERAGE	246872416.	2.160	533247200.	181141632.	12495.
BASE/COE PAYROLL EXPENDITURES	3500000.	2.248	22423798.	7651000.	520.

expenditures would surpass 73 million dollars. The total final demand change in the county would be almost 247 million dollars in 1987. The table also presents the RIMS multipliers used in the analysis. The most important of these multipliers is that for personal consumption expenditures, 2.248 in Clark County. This multiplier is used to evaluate the indirect economic effects of base payroll expenditures, DDA payroll expenditures, and site activation task force (SATAF) payroll expenditures. The third column of data in the table represents current year gross output change. This measures the change in gross output in 1987 as a result of the final demand changes and the multiplier effects--some of which are lagged. In other words, current year gross output change consists of some lagged effects from previous years, but only a portion (70 percent) of the final demand change in the current year.

The fourth column of data on page 2 of Table 5.1-1 represents the earnings change associated with the current year gross output change. Earnings are calculated using the earnings gross output ratios presented in Section 3. The fifth column of data represents the indirect employment resulting from each category of final demand change associated with the project. Total indirect earnings and indirect employment are presented in the table as well. Note that these indirect earnings and employment estimates are those presented in a more summarized fashion on page 1 of Table 5.1-1.

These changes in earnings and employment are not disaggregated to specific industrial sectors. The RIMS multiplier relates a final demand change in a specific sector--such as retail trade--to total earnings and employment changes in the economy. The details on the second page of Table 5.1-1 represent a disaggregation of indirect earnings and employment by type of stimulus or type of final demand change, rather than by the sector in which these earnings and employment would occur. As the table indicates, base payroll expenditures are the leading source of indirect employment in the county in 1987--4,276 indirect jobs created in various sectors of the county economy. DDA payroll expenditures represent the source of 3,637 indirect jobs in the county. Off-base housing construction would stimulate an additional 1,661 jobs, and payroll expenditures from SATAF personnel would create 528 jobs. Even though the last line of the table (SATAF/COE payroll expenditures) appears below the total or average, it is included in the total or average.

5.2 IMPACTS BY COUNTY OF RESIDENCE

Table 5.2-1 presents employment impacts by county of residence, as opposed to impacts by county of employment presented in Table 5.1-1. As in the previous table, some of the critical model run identifiers appear at the top of the table. These include the county, the year, and the assumption about the percentage of military on base, whether or not a base is located in the county, and if so, a first or second operating base, whether unmodified or modified RIMS multipliers were used, and the alternative under consideration. Again, the data in Table 5.2-1 are for Clark County in 1987 for the Proposed Action. In the line at the top of the table that identifies the "Proposed Action: Full deployment--Nevada/Utah," if this run is based on the trend growth or low baseline projections, an (L) appears after "Nevada/Utah". Since no (L) appears on this line of the output, the user may correctly assume that this run is based on the high growth baseline. In the case of Clark County, there is very little difference between the two baselines--approximately 500 jobs in 1987.

8 JUL 81

REGION CLARK YEAR 1987 PERCENT MILITARY ONBASE 80.0

MAIN BASE IN THIS REGION
UNMODIFIED R I M S MULTIPLIERS USED
BASE IN THIS REGION
PROPOSED ACTION FULL DEPLOYMENT - NEVADA/UTAH
BASE I AT COYOTE SPRING, NV (CLARK CO)
BASE II AT MILFORD, UT (BEAVER CO)

IMPACTS BY COUNTY OF RESIDENCE

POPULATION IMPACTS

PRINCIPAL EMPLOYMENT TYPE	EMPLOYMENT	COMMUNITY	BASE	CAMP	TOTAL
SHELTER CONSTRUCTION	0	0	0	0	0
SHELTER ASSEMBLY AND CO	230	614	0	0	614
BASE CONSTRUCTION	999	0	0	0	0
BASE ASS AND CO	1188	2138	625	0	2763
OPERATIONS, MILITARY	6185	3166	12666	0	15832
OPERATIONS, CIVILIANS	1151	520	0	0	520
INDIRECT EMPLOYMENT	12495	23703	0	0	23703
TOTAL	22248	30141	13291	0	43431
NET INMIGRATION FROM PREV YEAR		-3613	3186	0	-428

LABOR FORCE IMPACTS

BASELINE POPULATION		594187
BASELINE LF PARTICIPATION RATE		47.8
BASELINE LABOR FORCE		284021
BASELINE EMPLOYMENT (LF CONCEPT)		262152
BASELINE UNEMPLOYMENT		21870
UNEMPLOYMENT RATE		7.7
AVAILABLE RESIDENT LABOR FORCE		4828
-- FOR CONSTRUCTION	1449	
-- FOR OPERATIONS	966	
FOR INDIRECT EMPLOYMENT	2414	
INMIGRANT CONSTRUCTION LABOR FORCE		0
INMIGRANT ASSEMBLY AND CHECKOUT LF		1218
INMIGRANT CIVILIAN OPS LABOR FORCE		106
INMIGRANT SECONDARY LABOR FORCE		3379
ADDITIONAL INDIRECT LF INMIGRATION		7138
TOTAL INMIGRANT LABOR FORCE		11900
LABOR FORCE WITH PROJECT		295921
EMPLOYMENT WITH PROJECT		270815
UNEMPLOYMENT WITH PROJECT		17706
UNEMPLOYMENT RATE WITH PROJECT		6.0
POPULATION WITH PROJECT		617418

The first portion of the data presented in Table 5.2-1 summarizes employment and population impacts on a place-of-residence basis. The eight employment categories presented in Table 5.1-1 have been collapsed for purposes of convenience to seven categories by aggregating both the officers and enlisted personnel into one military operations category. The other five direct employment categories--DDA construction, DDA assembly and checkout, base construction, base assembly and checkout, and operations civilians--have not been altered. Indirect employment estimates also appear in the table. The employment projections presented in the table have been adjusted for cross-county commuting using the employment-residence allocation matrices presented in Section 4 of this report. Differences between the employment projections in Table 5.2-1 and those presented in Table 5.1-1 are the result of assumptions about cross-county commuting.

Table 5.2-1 also presents estimated population impacts by generic type of location at the subcounty level for Clark County. The three population location categories considered in this analysis--communities, bases, and camps--are presented in the table, as are total population impacts. These impacts are presented as well by principal employment type of the primary M-X-related in-migrant. For example, in Clark County in 1987 a total of 614 persons are assumed to be added to the county population as a result of employment of 232 people in shelter assembly and checkout. In the case of Clark County, these assembly and checkout workers are SATAF workers, since no DDA construction camps are located in the county. For base assembly and checkout workers, employment of 1,188 persons by place of residence is projected for the county, with a total of 2,763 persons in the county. Of these 2,763 persons 2,138 are assigned to the communities and 625 to the base location itself. Military operations workers--a total of 6,185 workers--trigger a population impact of 15,832 in the county. Of this population impact, 12,666 would reside on the base, and 3,166 would reside in communities. Population impacts by subcounty place of residence and employment type are presented for all seven employment types in the data table. Total employment by place-of-residence--22,248 persons in Clark County in 1987--is presented in the table, as are population totals for the various subcounty locations. A total of 43,431 persons are projected to reside in Clark County in 1987 as a result of M-X. This projection represents persons who would not otherwise be there. The figure of 43,431 consequently represents the impact of M-X and is an increment to baseline population projections.

The table also presents calculations showing net in-migration from the previous year. These calculations are presented by type of population location--communities, bases, and camps. In 1987, the M-X-related population change in communities is smaller than it was in 1986, and, consequently, a negative 3,613 persons are recorded as net M-X-related population in-migration (in this case, out-migration) from the previous year. At the base, a total of 3,186 persons were added to the base population since 1986, so this figure appears as net in-migration from the previous year. The sum of these two figures, or a negative 428 persons, represents the net change in M-X-related population impacts in the county.

The lower portion of the table presents labor force impacts associated with these employment and population effects. Baseline projected population of Clark County in 1987 is presented in the table--594,187 persons. The projected baseline labor force participation rate is 47.8 percent of the total population (see Chapter 3 of the EIS and Section 4 of this report). The resulting projected labor force under

baseline conditions is 284,021 persons. The unemployment rate is assumed to be 7.7 percent in Clark County in 1987. This implies that baseline employment using the labor force concept is 262,152 persons in Clark County in 1987, and unemployment is 21,870.

In Clark County, the threshold or in-migration trigger unemployment rate is assumed to be 6.0 percent of the labor force. Consequently, the difference between 7.7 baseline unemployment and 6.0 percent in-migration trigger unemployment--1.7 percent of the labor force--is projected to be available for M-X-related employment without labor force in-migration. This amounts to 4,828 persons in 1987. This projected available resident labor force is further subdivided into persons assumed to be employable for (1) construction, (2) operations, and (3) indirect employment. Thirty percent of the projected available resident labor force is assumed to be available for construction employment, and this represents 1,449 persons in 1987 in Clark County. Of the available resident labor force, an additional 20 percent is assumed to be available for operations, or 966 persons of the 4,828. The remaining 50 percent of the projected available resident labor force--2,414 persons in 1987 in Clark County--is assumed to be employable in indirect employment. If employment demands by specific M-X-related employment type as shown in the upper portion of Table 5.2-1 exceed these resident labor force totals, in-migration is projected to occur. For example, base construction employment of 999 persons in the county in 1987 is less than the projected available resident labor force for construction of 1,449. As a result, no labor force in-migration is projected to occur in this category, and population impacts shown on the base construction line of the upper portion of Table 5.2-1 consequently are zero.

The in-migrant civilian labor force by type of primary employment also is shown in Table 5.2-1 below the estimates of available resident labor force. The in-migrant construction labor force in Clark County in 1987 is zero, as previously indicated. The in-migrant assembly and check-out labor force is 1,218 persons. The in-migrant civilian operations labor force is 186 persons. The in-migrant secondary labor force--those persons projected to be in the labor force who move into the county as dependents of primary M-X employees--is projected to be 3,379 persons in 1987. Additional indirect labor force in-migration is projected to be 7,118. The total in-migrant civilian labor force is the sum of these five categories, or 11,900 persons. This total reflects only civilian labor force in-migrants, and military in-migrants--shown above in the table as 6,185--are in addition to this civilian labor force in-migrant total.

The bottom portion of Table 5.2-1 presents projections of the civilian labor force, unemployment and population with the project as opposed to baseline conditions in Clark County. The labor force with the project is 295,922 persons. This is the sum of the baseline labor force presented in the third line under "Labor Force Impacts" and the total civilian in-migrant labor force of 11,900 persons. (All estimates are subject to small amounts of rounding error.) Employment with the project is projected to be 278,215, the sum of projected baseline employment of 262,152 plus civilian employment related to M-X in the county in 1987. Military employment would be in addition to this total. Unemployment with the project is projected to be 17,706, slightly less than baseline unemployment of 21,870. This implies an unemployment rate of 6.0 percent with the project, 1.7 percentage points below projected unemployment without the project. Population with the project is equal to baseline population plus M-X-related in-migrant population or 594,187 persons plus 43,431 persons.

Unemployment rates with the project are determined by the assumed baseline unemployment rate and assumed unemployment rates for each of the in-migrant labor force categories presented in Section 4 of this report.

6.0 MODEL VALIDATION

6.1 INTRODUCTION

An updated and revised version of the UPED 79 model of the University of Utah's Bureau of Economic and Business Research was developed and used to make projections of employment and population in the Nevada/Utah deployment region with and without M-X. The UPED 79 model is a dynamic economic base simulation model projecting basic and residentiary employment at the 2-digit Standard Industrial Classification code level of sectoral disaggregation. The demographic component of the model is an age-cohort model.

6.2 RESULTS

Table 6.2-1 presents projections of employment from the UPED 79 model as well as from the regional economic impact model documented in this report. This comparison is based on the direct employment data used in the M-X Deployment Area Selection-Land Withdrawal/Acquisition DEIS (December 1980). The M-X economic impact model parameters also are those of the DEIS, and differ somewhat from the parameter values reported here (see ETR-27, December 1980).

At the regional level, the DEIS reported a peak M-X employment impact of 58,600 jobs using the interindustry impact model in 1987 for Alternative 3, the only alternative for which comparable model runs have been analyzed. The UPED simulation resulted in a peak employment estimate of 51,440, about 12 percent lower than the interindustry estimate. Long-term differences between the two model runs were negligible--a projection of 17,850 using the interindustry model and 18,980 using the UPED model. With a peak-year direct employment total of 30,000 jobs, the crude ex-post employment multiplier for the interindustry model at the regional level is 1.95. For the UPED model, the analogous multiplier is 1.71. In the long run, the interindustry model implies a multiplier of 1.35 while the UPED multiplier is 1.44.

In general, county-level impact estimates are more sensitive to the methodology used than are the results at the regional level. Iron and White Pine counties would experience large employment changes in each case because the operating bases would be located in these counties under Alternative 3. Peak interindustry employment estimates for these counties are 28-35 percent higher than the UPED estimates. Base-county long-term estimates are much more similar. In most DDA counties--Eureka, Lincoln, Nye, Juab, and Millard--the UPED simulation results tend to be higher than the interindustry estimates.

These variations in results are at least partially attributable to general methodological differences, particularly:

- The sensitivity of the interindustry results to assumptions about wage rates and the regional distribution of direct expenditures; and
- The relationship between employment and population which underlies the simulation approach.

Table 6.2-1. Comparison of M-X employment impact estimates from inter-industry and Alternative 3, DEIS direct ekmployment and parameter assumptions.

REGION	TREND-GROWTH EMPLOYMENT LABOR FORCE CONCEPT	INTER-INDUSTRY MODEL IMPACT ESTIMATES	IMPACT AS PERCENT OF BASELINE	TREND-GROWTH EMPLOYMENT ESTABLISHMENT CONCEPT	SIMULATION MODEL IMPACT ESTIMATES	IMPACT AS PERCENT OF BASELINE
Regional Total						
Peak Year (1987)	740,480	58,600	8	822,160	51,440	6
Long Term	849,580	17,850	2	949,240	18,980	2
Clark County, NV						
Peak Year (1986	248,840	8,590	4	271,170	3,410	1
Long Term	305,170	660	–	329,080	1,060	–
Eureka County, NV						
Peak Year (1988)	650	3,470	536	570	5,080	891
Long Term	720	0	0	630	0	0
Lincoln County, NV						
Peak Year (1986)	1,830	2,630	144	1,470	7,800	531
Long Term	2,090	230	11	1,690	10	1
[illegible] County, NV						
Peak Year (1988)	3,350	6,400	180	7,070	10,950	155
Long Term	3,990	20	1	7,650	10	0
White Pine County,UT						
Peak Year (1987)	3,090	11,220	364	2,670	8,270	310
Long Term	3,510	7,140	203	3,140	5,930	189
Beaver County, UT						
Peak Year (1986)	2,210	2,570	116	1,740	30	2
Long Term	2,380	680	29	1,980	10	1
Iron County, UT						
Peak Year (1986)	8,730	12,170	139	8,690	9,490	109
Long Term	10,280	7,560	74	10,170	7,830	77
Juab County, UT						
Peak Year (1987)	2,570	2,740	107	2,800	4,280	153
Long Term	2,890	0	0	3,150	10	–
Millard County, UT						
Peak Year (1988)	4,830	3,240	72	3,760	4,830	129
Long Term	4,860	0	0	4,020	10	–
Salt Lake Utah, UT						
Peak Year (1987)	447,110	10,950	2	507,860	11,960	2
Long Term	501,350	770	–	579,270	4,080	1
Washington County,UT						
Peak Year (1986)	10,200	1,080	11	N.A.	N.A.	N.A.
Long Term	12,340	800	6	N.A.	N.A.	N.A.

[illegible]ation. 3939

[illegible]'s model shows peak in 1986 of 9,170, 355 percent of baseline of 2,585.

NOTE: – indicates less than 0.5 percent, but not zero. N.A. indicates not available.

The results of the two analyses, disaggregated to the level of base and non-base counties, are presented graphically in Figure 6.2-1.

These variations are indicative of the general level of uncertainty regarding the spatial distribution of project impacts. Because the interindustry analysis has been consistently applied to all the deployment options considered here, the results of this analysis form the basis for all socioeconomic impacts discussed in the EIS.

Both models indicate that M-X would generate extremely large employment impacts in the deployment region compared to projected levels of employment without M-X.

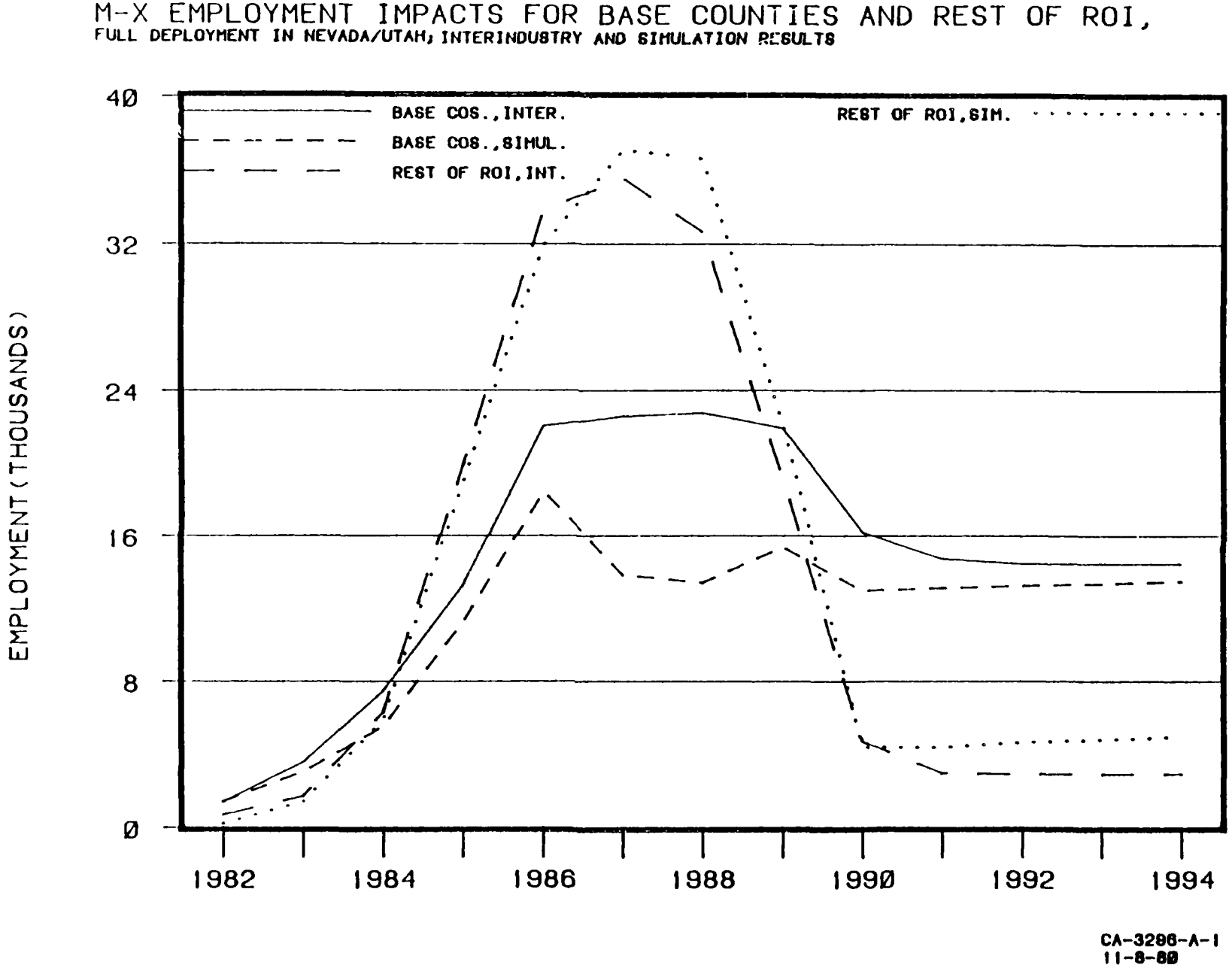


Figure 6.2-1. M-X DEIS employment impacts for base counties and the rest of the ROI (for Alternative 3).

REFERENCES

Cartwright, Joseph V., 1979. "Estimating the Spatial Distribution of Program Impacts Within Metropolitan Areas," U.S. Bureau of Economic Analysis, Regional Economic Analysis Division, Washington, D.C.

Cartwright, Joseph V., Richard M. Beemiller, and Richard D. Gustely, 1980. "RIMS II: A Disaggregated Regional Input-Output Modeling System," U.S. Bureau of Economic Analysis, Regional Economic Analysis Division, Washington, D.C.

Chase Econometric Associates, Inc. "Long-term Standard Trend Forecast of January 14, 1981," and "Regional Long-term Forecast, First Quarter 1981."

Clark County Board of Commissioners, 1977. Clark County 208 Water Quality Management Plan, Growth Forecasts, Environmental Report No. 3, November.

Council of Economic Advisors, 1981. Economic Report of the President, Washington, D.C., January.

Departments of Employment Security, Nevada, Utah, Texas, and New Mexico, 1980 and 1981. Unpublished data.

Drake, Ronald L., 1976. "A Short-Cut to Estimates of Regional Input-Output Multipliers," International Regional Science Review, Vol. I, No. 2.

Grossman, Allyson S., 1981. "The Employment Situation for Military Wives," Monthly Labor Review, U.S. Department of Labor, February, pp. 60-64.

Liew, C.K., November 1977. "Dynamic Multipliers for a Regional Input-Output Model," Annals of Regional Science, II (3): 94-106.

Nevada Employment Security Department, 1980. Nevada Employment and Payrolls, 1979, Carson City, Nevada.

Nevada Employment Security Department, 1981. Personal communication, Mr. Dan Colbert, 11 May 1981.

New Mexico Employment Security Department, 1980 and 1981. Covered Employment and Wages Quarterly Report, selected issues, Santa Fe, New Mexico.

Old West Regional Commission, 1975. Construction Worker Profile. Prepared by Mountain Research, Inc.

Ralph M. Parsons Company, 1981. M-X Verifiable Horizontal MPS Construction Concepts Investigation: Operational Construction Cost Estimate, "Labor-Project Requirements," Prepared for U.S. Air Force, Norton AFB, California.

Ritz, Philip M, February 1979. "The Input-Output Structure of the U.S. Economy, 1972," Survey of Current Business. Vol. 59, No. 2, Washington D.C.: U.S. Department of Commerce, Bureau of Economic Analysis.

Ritz, P.M., E.P. Roberts, and P.C. Young. "Dollar-Value Tables for the 1972 Input-Output Study," Survey of Current Business, 59, no. 4, Washington, D.C.: U.S. Department of Commerce.

Stone, R.A., J. Bates, and M. Bacharach, 1963. A Programme for Growth: Input-Output Relationships, 1954-1966, Great Britain: Chapman and Hall.

Texas Employment Commission, 1980 and 1981. Covered Employment and Wages, by Industry and County, selected issues, Austin, Texas.

United Nations, Department of Economic and Social Affairs, 1968. A System of National Accounts. Studies in Methods, Series F, No. 2, Rev. 3. New York.

U.S. Air Force, 1980a. Personal communication, W.A. Nixon, Headquarters, Air Force Engineering and Services Center, 24 July 1980, Tyndall AFB, Florida.

U.S. Air Force, 1980b. "ASC Procurement Estimates," Decision Memorandum 81-6, 9 October 1980, Norton AFB, California.

U.S. Air Force, 1981. "CraftStudy," Attachment 6. AFRCE/M-X, Task Force for Manpower Requirements, Norton AFB, California.

U.S. Air Force, Revised March 1977. TAB A-1 Environmental Narrative: Ellsworth AFB, Rapid City, South Dakota, Sec. 4.2.4.1, p. 64.

U.S. Air Force, Revised 19 April 1978. TAB A-1 Environmental Narrative: Grand Forks AFB, Emerado, North Dakota, Sec. 4.2.4.1, p.73.

U.S. Air Force, Revised 15 August 1977. TAB A-1 Environmental Narrative: Malmstrom AFB Great Falls, Montana, Sec. 4.2.4.1, p. 4-21.

U.S. Air Force, Revised 15 August 1977. TAB A-1 Environmental Narrative: Minot AFB, Minot, North Dakota, Sec. 4.2.4.1, p.60.

U.S. Air Force, Revised July 1977. TAB A-1 Environmental Narrative Phase II: F.E. Warren AFB, Cheyenne, Wyoming, Sec. 4.2.4.1, p. 83.

U.S. Air Force, Revised 10 August 1977. TAB A-1 Environmental Narrative Phase II: Whiteman AFB, Knob Noster Missouri, Sec. 4.2.4.1, p. 86.

U.S. Bureau of the Census, 1976. County Business Patterns. Washington, D.C.

U.S. Bureau of the Census, 1980. Preliminary Population Counts, Nevada, Utah, Texas, and New Mexico, Washington, D.C.

U.S. Department of Commerce, 1977. 1974 Census of Agriculture. Bureau of the Census, Washington, D.C.

U.S. Department of Commerce, 1979. 1972 U.S. Input-Output Tables, Bureau of Economic Analysis, Washington, D.C.

U.S. Department of Commerce, 1980. Regional Economic Information System, Bureau of Economic Analysis, Washington, D.C.

U.S. Department of Commerce, 1981. Regional Economic Information System, Bureau of Economic Analysis, Washington, D.C.

Utah Department of Employment Security, 1981. Employment Newsletter, March 1981. Salt Lake City, Utah.

U.S. Department of Energy, 1978. Socioeconomic Impact Assessment: A Methodology Applied to Synthetic Fuels. Prepared by Murphy/Williams Urban Planning and Housing Consultants. Washington, D.C.

U.S. Department of Labor, 1979. Union Wages and Benefits: Building Trades, July 3, 1978. Bureau of Labor Statistics, Washington, D.C.

U.S. Geological Survey, 1979. Selected maps of Nevada, Utah, Texas, and New Mexico at 1:500,000 scale.

U.S. Water Resources Council, 1977. Guideline 5: Regional Multipliers, Washington, D.C.

University of Utah, Bureau of Economic and Business Research, October 1980. Allocation of Final Projections of Broad Area Impacts of M-X Missile Deployment in Nevada and Utah to the Community Group (CCD and County) Level. With appendices. Salt Lake City, Utah.

APPENDIX A

Table A-1. SHELTER CONSTRUCTION EMPLOYMENT BY CAMPS PER COUNTY
NEVADA/UTAH Full Deployment
Proposed Action and Alternatives 1, 2, 4, and 6

COUNTY & CAMP #'S	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CLARK CO ,NEV	0	0	0	0	0	0	0	0	0	0	0	0	0
SALT LAKE CO ,UT	0	0	0	0	0	0	0	0	0	0	0	0	0
MILLARD CO ,UT	197	817	1867	3769	2978	1449	0	0	0	0	0	0	0
(4)													
(5)													
(6)													
BEAVER CO ,UT	107	442	924	1814	1100	0	0	0	0	0	0	0	0
(3)													
IRON CO UT	0	0	0	0	0	0	0	0	0	0	0	0	0
LINCOLN CO ,NEV	197	817	1762	3549	2067	0	0	0	0	0	0	0	0
(1)													
(2)													
WHITE PINE CO. ,NEV	0	0	0	56	322	1271	2636	1476	0	0	0	0	0
(15)													
(16)													
EUREKA CO ,NEV	0	0	0	139	777	1852	3349	1877	0	0	0	0	0
(17)													
(18)													
NYE CO ,NEV	142	578	1856	3717	6313	7800	4017	1143	0	0	0	0	0
(9)													
(10)													
(11)													
(12)													
(13)													
(14)													
JUAB CO ,UT	0	0	160	386	1282	2347	2045	994	0	0	0	0	0
(7)													
(8)													
WASHINGTON CO ,UT	0	0	0	0	0	0	0	0	0	0	0	0	0

Table A-2. SHELTER ASSEMBLY & CO EMPLOYMENT BY CAMPS PER COUNTY

NEVADA/UTAH Full Deployment

Proposed Action and Alternatives 1, 2, 4, and 6

COUNTY & CAMP #'S	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CLARK CO ,NEV	0	0	0	0	0	0	0	0	0	0	0	0	0
SALT LAKE CO ,UT	0	0	0	0	0	0	0	0	0	0	0	0	0
MILLARD CO ,UT	0	0	50	25	875	1125	525	0	0	0	0	0	0
(4)													
(5)													
(6)													
BEAVER CO ,UT	0	0	25	25	800	325	0	0	0	0	0	0	0
(3)													
IRON CO UT	0	0	0	0	0	0	0	0	0	0	0	0	0
LINCOLN CO ,NEV	10	100	200	1150	1400	300	0	0	0	0	0	0	0
(1)													
(2)													
WHITE PINE CO ,NEV	0	0	0	0	25	50	450	1000	25	0	0	0	0
(15)													
(16)													
EUREKA CO ,NEV	0	0	0	0	25	50	825	1200	50	0	0	0	0
(17)													
(18)													
NYE CO ,NEV	0	0	25	50	850	2200	1825	1250	25	0	0	0	0
(9)													
(10)													
(11)													
(12)													
(13)													
(14)													
JUAB CO ,UT	0	0	0	0	25	250	675	900	0	0	0	0	0
(7)													
(8)													
WASHINGTON CO ,UT	0	0	0	0	0	0	0	0	0	0	0	0	0

Table A-3. SHELTER CONSTRUCTION EMPLOYMENT BY CAMPS PER COUNTY

NEVADA/UTAH Full Deployment, Alternatives 3 and 5

COUNTY & CAMP #'S	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CLARK CO ,NEV	0	0	0	0	0	0	0	0	0	0	0	0	0
SALT LAKE CO ,UT	0	0	0	0	0	0	0	0	0	0	0	0	0
MILLARD CO ,UT	336	879	1165	3975	1655	1248	1701	118	0	0	0	0	0
(4)													
(5)													
(6)													
BEAVER CO ,UT	391	676	332	1823	1165	0	0	0	0	0	0	0	0
(3)													
IRON CO UT	0	0	0	0	0	0	0	0	0	0	0	0	0
LINCOLN CO ,NEV	0	417	909	1958	1595	600	1467	1449	0	0	0	0	0
(1)													
(2)													
WHITE PINE CO ,NEV	0	0	478	816	1784	2597	97	0	0	0	0	0	0
(15)													
(16)													
EUREKA CO ,NEV	0	0	308	931	1278	3129	2089	256	0	0	0	0	0
(17)													
(18)													
NYE CO ,NEV	0	1044	3482	5016	7583	4998	2489	948	0	0	0	0	0
(9)													
(10)													
(11)													
(12)													
(13)													
(14)													
JUAB CO ,UT	0	0	0	308	856	1004	3547	1501	0	0	0	0	0
(7)													
(8)													
WASHINGTON CO ,UT	0	0	0	0	0	0	0	0	0	0	0	0	0

Table A-4. SHELTER ASSEMBLY & CO EMPLOYMENT BY CAMPS PER COUNTY

NEVADA/UTAH Full Deployment, Alternatives 3 and 5

COUNTY & CAMP #'S	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CLARK CO ,NEV	0	0	0	0	0	0	0	0	0	0	0	0	0
SALT LAKE CO ,UT	0	0	0	0	0	0	0	0	0	0	0	0	0
MILLARD CO ,UT	10	100	120	1050	2178	26	498	386	0	0	0	0	0
(4)													
(5)													
(6)													
BEAVER CO ,UT	0	0	30	50	1003	333	0	0	0	0	0	0	0
(3)													
IRON CO UT	0	0	0	0	0	0	0	0	0	0	0	0	0
LINCOLN CO ,NEV	0	0	30	50	620	0	32	1084	0	0	0	0	0
(1)													
(2)													
WHITE PINE CO ,NEV	0	0	0	0	35	570	900	0	0	0	0	0	0
(15)													
(16)													
EUREKA CO ,NEV	0	0	0	0	11	75	1860	0	0	0	0	0	0
(17)													
(18)													
NYE CO ,NEV	0	0	120	100	153	3289	968	1206	0	0	0	0	0
(9)													
(10)													
(11)													
(12)													
(13)													
(14)													
JUAB CO ,UT	0	0	0	0	0	7	92	1674	0	0	0	0	0
(7)													
(8)													
WASHINGTON CO ,UT	0	0	0	0	0	0	0	0	0	0	0	0	0

Table A-5. SHELTER CONSTRUCTION EMPLOYMENT BY CAMPS PER COUNTY

NEVADA/UTAH SPLIT DEPLOYMENT

COUNTY & CAMP #'S	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CLARK CO ,NEV	0	0	0	0	0	0	0	0	0	0	0	0	0
SALT LAKE CO ,UT	0	0	0	0	0	0	0	0	0	0	0	0	0
MILLARD CO ,UT	0	0	751	1539	2759	3514	542	0	0	0	0	0	0
(4)													
(5)													
BEAVER CO ,UT	0	399	768	1939	1428	0	0	0	0	0	0	0	0
(3)													
IRON CO UT	0	0	0	0	0	0	0	0	0	0	0	0	0
LINCOLN CO ,NEV	297	907	1324	3687	1542	0	0	0	0	0	0	0	0
(1)													
(2)													
WHITE PINE CO ,NEV	0	0	0	0	0	0	0	0	0	0	0	0	0
EUREKA CO ,NEV	0	0	0	0	0	0	0	0	0	0	0	0	0
NYE CO ,NEV	0	0	495	888	1953	3555	4805	2037	0	0	0	0	0
(6)													
(7)													
(8)													
JUAB CO ,UT	0	0	0	0	0	0	0	0	0	0	0	0	0
WASHINGTON CO ,UT	0	0	0	0	0	0	0	0	0	0	0	0	0

Table A-6. SHELTER ASSEMBLY & CO EMPLOYMENT BY CAMPS PER COUNTY

NEVADA/UTAH SPLIT DEPLOYMENT

COUNTY & CAMP #'S	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CLARK CO ,NEV	0	0	0	0	0	0	0	0	0	0	0	0	0
SALT LAKE CO ,UT	0	0	0	0	0	0	0	0	0	0	0	0	0
MILLARD CO ,UT	0	0	0	0	108	1914	1421	0	0	0	0	0	0
(4)													
(5)													
BEAVER CO ,UT	0	0	50	100	400	1032	0	0	0	0	0	0	0
(3)													
IRON CO UT	0	0	0	0	0	0	0	0	0	0	0	0	0
LINCOLN CO ,NEV	10	100	250	1150	2992	0	0	0	0	0	0	0	0
(1)													
(2)													
WHITE PINE CO ,NEV	0	0	0	0	0	0	0	0	0	0	0	0	0
EUREKA CO ,NEV	0	0	0	0	0	0	0	0	0	0	0	0	0
NYE CO ,NEV	0	0	0	0	50	106	1670	2790	70	0	0	0	0
(6)													
(7)													
(8)													
BOX ELDER CO ,UT	0	0	0	0	0	0	0	0	0	0	0	0	0
WASHINGTON CO ,UT	0	0	0	0	0	0	0	0	0	0	0	0	0

Table A-7. SHELTER CONSTRUCTION EMPLOYMENT BY CAMPS PER COUNTY

TEXAS/NEW MEXICO Full Deployment

COUNTY & CAMP #'S	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TEXAS													
DALLAM CO	0	253	1046	3299	2996	3809	2067	159	0	0	0	0	0
(13)													
(14)													
(15)													
HARTLEY CO	0	471	1018	1662	1748	471	0	0	0	0	0	0	0
(11)													
SHERMAN CO	0	0	0	0	0	0	0	0	0	0	0	0	0
MOORE CO	0	0	0	0	0	0	0	0	0	0	0	0	0
POLTER/RANDALL CO S	0	0	0	0	0	0	0	0	0	0	0	0	0
DEAF SMITH CO	0	0	166	558	1308	2461	2311	1086	0	0	0	0	0
(9)													
(10)													
SWISHER CO	0	0	0	0	0	0	0	0	0	0	0	0	0
PARMER CO	0	0	110	368	1065	1912	1461	1048	0	0	0	0	0
(6)													
(7)													
BAILEY CO	69	397	967	1664	1500	382	0	0	0	0	0	0	0
(3)													
LAMB CO	0	0	0	0	0	0	0	0	0	0	0	0	0
LUBBOCK CO	0	0	0	0	0	0	0	0	0	0	0	0	0
HALE CO	0	0	0	0	0	0	0	0	0	0	0	0	0
HOCKLEY CO	0	0	0	0	0	0	0	0	0	0	0	0	0
COCHRAN CO	0	0	0	0	0	0	0	0	0	0	0	0	0
OLDHAM CO	0	0	0	0	0	0	0	0	0	0	0	0	0
CASTRO CO	0	0	0	0	198	445	1401	1122	0	0	0	0	0
(8)													
NEW MEXICO													
QUAY CO	479	938	1407	1891	1246	176	0	0	0	0	0	0	0
(5)													
CURRY CO	0	0	0	0	0	0	0	0	0	0	0	0	0
DEBACA CO	0	0	0	0	0	0	0	0	0	0	0	0	0
ROOSEVELT CO	133	767	1880	3314	3072	673	0	0	0	0	0	0	0
(2)													
(4)													
CHAVES CO	0	0	0	435	829	1639	1694	382	0	0	0	0	0
(1)													
UNION CO	0	0	0	0	0	0	0	0	0	0	0	0	0
HARDING CO	0	0	0	501	1070	1673	1682	561	0	0	0	0	0
(12)													

Table A-8. SHELTER ASSEMBLY % CO EMPLOYMENT BY CAMPS PER COUNTY

TEXAS/NEW MEXICO Full Deployment

COUNTY % CAMP #'S	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TEXAS													
DALLAM CO	0	0	0	12	80	1368	1615	0	0	0	0	0	0
(13)													
(14)													
(15)													
HARTLEY CO	0	0	25	48	41	1273	0	0	0	0	0	0	0
(11)													
SHERMAN CO	0	0	0	0	0	0	0	0	0	0	0	0	0
MOORE CO	0	0	0	0	0	0	0	0	0	0	0	0	0
POTTER/RANDALL CO S	0	0	0	0	0	0	0	0	0	0	0	0	0
DEAF SMITH CO	0	0	0	0	28	53	1121	875	100	0	0	0	0
(9)													
(10)													
SWISHER CO	0	0	0	0	0	0	0	0	0	0	0	0	0
PARMER CO	0	0	0	0	3	53	915	863	0	0	0	0	0
(6)													
(7)													
BAILEY CO	0	0	75	48	674	0	0	0	0	0	0	0	0
(3)													
LAMB CO	0	0	0	0	0	0	0	0	0	0	0	0	0
LUBBOCK CO	0	0	0	0	0	0	0	0	0	0	0	0	0
HALE CO	0	0	0	0	0	0	0	0	0	0	0	0	0
HOCKLEY CO	0	0	0	0	0	0	0	0	0	0	0	0	0
COCHRAN CO	0	0	0	0	0	0	0	0	0	0	0	0	0
OLDHAM CO	0	0	0	0	0	0	0	0	0	0	0	0	0
CASTRO CO	0	0	0	48	0	0	50	840	0	0	0	0	0
(8)													
NEW MEXICO													
QUAY CO	0	0	75	48	202	1096	0	0	0	0	0	0	0
(5)													
CURRY CO	0	0	0	0	0	0	0	0	0	0	0	0	0
DEBACA CO	0	0	0	0	0	0	0	0	0	0	0	0	0
ROOSEVELT CO	10	100	125	1046	2965	364	0	0	0	0	0	0	0
(2)													
(4)													
CHAVES CO	0	0	0	0	0	40	60	1192	0	0	0	0	0
(1)													
UNION CO	0	0	0	0	0	0	0	0	0	0	0	0	0
HARDING CO	0	0	0	0	7	53	589	580	0	0	0	0	0
(12)													

Table A-9. SHELTER CONSTRUCTION EMPLOYMENT BY CAMPS PER COUNTY

TEXAS/NEW MEXICO SPLIT DEPLOYMENT

COUNTY & CAMP #'S	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TEXAS													
DALLAM CO (7)	0	0	0	0	363	504	1470	1755	0	0	0	0	0
HARTLEY CO (6)	0	0	0	442	766	1805	1761	228	0	0	0	0	0
SHERMAN CO	0	0	0	0	0	0	0	0	0	0	0	0	0
MOORE CO	0	0	0	0	0	0	0	0	0	0	0	0	0
POTTER/RANDALL CO S	0	0	0	0	0	0	0	0	0	0	0	0	0
DEAF SMITH CO (1)	0	0	58	477	854	1873	830	0	0	0	0	0	0
SWISHER CO	0	0	0	0	0	0	0	0	0	0	0	0	0
PARMER CO	0	0	0	0	0	0	0	0	0	0	0	0	0
BAILEY CO	0	0	0	0	0	0	0	0	0	0	0	0	0
LAMB CO	0	0	0	0	0	0	0	0	0	0	0	0	0
LUBBOCK CO	0	0	0	0	0	0	0	0	0	0	0	0	0
HALE CO	0	0	0	0	0	0	0	0	0	0	0	0	0
HOCKLEY CO	0	0	0	0	0	0	0	0	0	0	0	0	0
COCHRAN CO	0	0	0	0	0	0	0	0	0	0	0	0	0
DENMAN CO	0	0	0	0	0	0	0	0	0	0	0	0	0
CASTRO CO	0	0	0	0	0	0	0	0	0	0	0	0	0
NEW MEXICO													
QUAY CO (2)	71	573	669	1886	1797	144	0	0	0	0	0	0	0
CURRY CO	0	0	0	0	0	0	0	0	0	0	0	0	0
DEBACA CO	0	0	0	0	0	0	0	0	0	0	0	0	0
ROOSEVELT CO (3)	0	444	765	1662	1823	308	0	0	0	0	0	0	0
CHAVES CO (4)	0	0	71	573	669	1886	1659	144	0	0	0	0	0
UNION CO	0	0	0	0	0	0	0	0	0	0	0	0	0
HARDING CO (5)	0	473	817	1817	2253	316	0	0	0	0	0	0	0

Table A-10. SHELTER ASSEMBLY & CO EMPLOYMENT BY CAMPS PER COUNTY

TEXAS/NEW MEXICO SPLIT DEPLOYMENT

COUNTY & CAMP #'S	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TEXAS													
DALLAM CO (7)	0	0	0	0	0	0	63	1404	80	0	0	0	0
HARTLEY CO (6)	0	0	0	0	0	83	95	1404	0	0	0	0	0
SHERMAN CO	0	0	0	0	0	0	0	0	0	0	0	0	0
MOORE CO	0	0	0	0	0	0	0	0	0	0	0	0	0
POTTER/RANDALL CO S	0	0	0	0	0	0	0	0	0	0	0	0	0
DEAF SMITH CO (1)	0	0	0	0	15	90	1557	0	0	0	0	0	0
SWISHER CO	0	0	0	0	0	0	0	0	0	0	0	0	0
PARMER CO	0	0	0	0	0	0	0	0	0	0	0	0	0
BAILEY CO	0	0	0	0	0	0	0	0	0	0	0	0	0
LAMB CO	0	0	0	0	0	0	0	0	0	0	0	0	0
LUBBOCK CO	0	0	0	0	0	0	0	0	0	0	0	0	0
HALE CO	0	0	0	0	0	0	0	0	0	0	0	0	0
HOCKLEY CO	0	0	0	0	0	0	0	0	0	0	0	0	0
COCHRAN CO	0	0	0	0	0	0	0	0	0	0	0	0	0
OLDHAM CO	0	0	0	0	0	0	0	0	0	0	0	0	0
CASTRO CO	0	0	0	0	0	0	0	0	0	0	0	0	0
NEW MEXICO													
QUAY CO (2)	5	50	150	109	2215	559	0	0	0	0	0	0	0
CURRY CO	0	0	0	0	0	0	0	0	0	0	0	0	0
DE BACA CO	0	0	0	0	0	0	0	0	0	0	0	0	0
ROOSEVELT CO (4)	0	0	0	91	95	1133	378	0	0	0	0	0	0
CHAVES CO (4)	0	0	0	0	0	90	1417	402	0	0	0	0	0
UNION CO	0	0	0	0	0	0	0	0	0	0	0	0	0
HARDING CO (5)	0	0	0	109	95	1513	0	0	0	0	0	0	0

APPENDIX B

CONSTRUCTION-WORKER DAILY SUBSISTENCE ESTIMATES BY CRAFT

Table B-1. Construction worker daily subsistence estimates, by craft.

Craft Category	Daily Subsistence Payment (1978 Dollars)
Laborer	16.00
Operating Engineer	16.00
Carpenter	18.00
Teamster	16.00
Cement Mason	16.00
Iron Worker	20.00
Pipefitter	25.00
Electrician	25.00
Overall Average	19.00
Composite	16.50
Estimate Used	18.00[1]

T3979/10-2-81

[1] This estimate is equivalent to $20.51 in FY 1980 dollars, using the proportionate change in the GNP implicit price deflator of 173.29/152.05 = 1.140.

Source: Ralph M. Parsons Company, M-X Verifiable Horizontal Shelter.

APPENDIX C

ASSUMPTIONS AND CALCULATIONS FOR PROJECT-RELATED OFFBASE PUBLIC AND PRIVATE INVESTMENT ESTIMATES

The indirect capital investment data, which are presented per 1,000 M-X operations workers, reflect preliminary assumptions about the extent of indirect jobs generated as a result of the project and the economic-demographic characteristics of in-migrant populations. In addition, the data are computed based upon assumptions about demand or "requirements" for a stock of physical capital to accommodate the in-migrant population, including such community facilities as housing and non-residential buildings, streets and highways, public buildings such as schools, and public and private utilities, as well as unit costs for each type of facility (Murphy/Williams Urban Planning and Housing Consultants, 1978.). Data for three scenarios -- all military personnel housed onbase, 20 percent in communities, and 40 percent offbase -- are shown where applicable, although the final analysis incorporates only the assumption that 20 percent would reside offbase. As the data in Table C-1 show, the amount of offbase public and private capital investments would be especially sensitive to the proportion of military personnel obtaining accommodations in communities. Residency by military personnel in communities rather than onbase would generate demand not only for private housing but for other additional demand not only for private housing but for other additional offbase facilities as well. Compared to the first scenario, total public and private offbase capital investment required would be higher by almost two-thirds when 40 percent are accommodated offbase.

Although the demand for capital investment in offbase facilities would likely be much higher during the peak M-X construction "boom" period than in the long term operations phase, the assumption implicit in the estimation procedure used is that such investments are unlikely to exceed those needed to accommodate the permanent offbase population influx. These investments in construction of facilities, which would represent large amounts of unrecoverable "sunk" capital, are economically justified only if they provide a flow of services or benefits to the population over an extended period of time. Since benefits to the temporary construction-related population would be short-lived, large expenditures for permanent facilities to accommodate the maximum population influx during construction would not be warranted.

The data presented in the tables should be regarded as initial approximations of the amounts of investment in offbase facilities likely to occur. The current version of the community socioeconomic models, described in ETR-28, contain revised procedures and assumptions for computation of indirect investment data. The economic-demographic assumptions which form the basis for the data in Tables C-1 through C-7 include:

1) 1,000 direct operations personnel, consisting of 886 military and 114 civilian workers;

2) 310 military personnel (35 percent) are single and 576 (65 percent) are married;

3) One-fifth of each group would reside offbase: 62 single and 115 married military personnel; the average household size for single personnel is 1.25; the total number of offbase military households consists of 49 composed of single personnel plus 115 married or 164, as indicated in Table C-2;

4) One indirect job is generated for each two direct operations workers or 500 indirect jobs for the 1,000 operations workers assumed in the tables;

5) The number of civilian households (378) is comprised of 114 civilian operations workers and 264 indirect worker households. The number of indirect households is less than the 500 jobs due to labor force participation and employment of dependents of military and civilian direct personnel and indirect workers. The appropriate rates used in this analysis are shown in Table 4.3-1.

Other assumptions are shown separately in Tables C-2 through C-7.

Table C-1. Estimated total local public and private capital investment induced per 1,000 M-X operations personnel.

SCENARIO 1: 100 percent Military On Base	Offbase Housing	$ 13,017,000	
	Street Facilities	1,835,016	
	School Facilities	1,564,080	
	Other Buildings for Public Facilities	489,912	
	Utilities (Public and Private)	3,599,779	
	Retail Buildings	4,470,760	
	Services Buildings	1,176,520	
	Office Buildings	900,000	
	TOTAL	= $ 27,053,067	
		= $27,000,000	Per 1,000 Direct Employees
SCENARIO 2: 20 percent Military Off Base	Off-Base Housing	$ 18,650,000	
	Street Facilities	2,629,460	
	School Facilities	2,167,760	
	Other Public Buildings	558,337	
	Utilities (Public and Private)	5,158,235	
	Retail Buildings	4,470,760	
	Services Buildings	1,176,520	
	Office Buildings	900,000	
	TOTAL	= $ 35,711,072	
		= $35,500,000	Per 1,000 Direct Employees
SCENARIO 3: 40 percent Military Off Base	Off Base Housing	$ 24,235,000	
	Street Facilities	3,418,953	
	School Facilities	2,776,928	
	Other Public Buildings	626,762	
	Utilities (Public and Private)	6,704,996	
	Retail Buildings	4,470,760	
	Services Buildings	1,176,520	
	Office Buildings	900,000	
	TOTAL	= $ 44,309,919	
		= $44,500,000	Per 1,000 Direct Employees

3327

Source: HDR Sciences.

Table C-2. Estimated offbase housing investment demands.

SCENARIO 1:	ALL MILITARY HOUSEHOLDS ON BASE					
	Total Housing Units Required[1]	=	378	x 1.05	=	397
	Less Mobile Homes[2]	=	397	x .25	=	99
	Number Conventional Homes	=			=	298
	Number Single-Family Houses (S.F.)	=	397	x .50	=	199
	Number Multi-Family Units (M.F.)	=	397	x .25	=	99
	Total Cost S.F. Construction[3]	=	199	x $48,000	=	$9,552,000
	Total Cost M.F. Construction	=	99	x $35,000	=	3,465,000
	Total Residential Construction Cost	=				13,017,000
SCENARIO 2:	20 PERCENT MILITARY HOUSEHOLDS OFF-BASE (164 H.H.)					
	Total Housing Units Required	=	542	x 1.05	=	569
	Less Mobile Homes	=	569	x .25	=	142
	Number Conventional Homes	=			=	427
	Number S.F.	=	569	.50	=	285
	Number M.F.	=	569	x .25	=	142
	Total Cost S.F. Construction	=	285	x $48,000	=	$13,680,000
	Total Cost M.F. Construction	=	142	x $35,000	=	4,970,000
	Total Residential Construction Cost	=			=	18,650,000
SCENARIO 3:	40 PERCENT MILITARY HOUSEHOLDS OFF-BASE (328 H.H.)					
	Total Housing Units Required	=	706	x 1.05	=	740
	Less Mobile Homes	=	741	x .25	=	185
	Number of Conventional Homes	=			=	556
	Number S.F.	=	741	x .50	=	370
	Number M.F.	=	741	x .25	=	185
	Total Cost S.F. Construction	=	370	x $48,000	=	$17,760,000
	Total Cost M.F. Construction	=	185	x $35,000	=	6,475,000
	Total Residential Construction Cost	=			=	24,235,000
					=	$24,250,000

3328-1

[1] Total housing units = Number of households x 1.05

[2] 25 percent of housing requirements assumed to be supplied by mobile homes, 25 percent by multi-unit housing, and 50 percent by single-family units.

[3] Construction costs, including building materials and on-site labor, are assumed to $48,000 per S.F. unit and $35,000 per M.F. unit.

Source: HDR Sciences, based on planning factors recommended by Murphy Williams Urban Planning and Housing Consultants, Socioeconomic Impact Assessment A Methodology Applied to Synthetic Fuels, U.S. Department of Energy, Washington, D.C., 1978.

Table C-3. Estimated street facility costs per 1,000 direct operations employees. (Page 1 of 3)

ASSUMPTIONS:

1. Arterial Street Length

   Residential related = 6.1 linear feet per S.F. House
   + 5.5 linear feet per Mobile Home
   + 5.0 linear feet per M.F. Unit

   + Community Street System = 1.76 x Residential related

2. Collector Street Length

   Residential related = 7.0 linear feet per S.F. House
   +17.25 linear feet per Mobile Home
   +13.50 linear feet per M.F. Unit

   + Community Street System = 1.1 x Residential related

3. Minor Street Length

   Residential related = 47.0 linear feet per S.F. House
   + 22.0 linear feet per Mobile Home
   + 10.0 linear feet per M.F. Unit

   + Community Street System = 1.1 x Residential related

4. Cost Per Linear Foot

	1975		Inflation Factor		1978 $
Arterials	= $ 142	x	1.21	= $ 172	
Collectors	= 70	x	1.2.	= $ 85	
Minor	= 45	x	1.21	= $ 54	

3309-1

Table C-3. Estimated street facility costs per 1,000 direct operations employees. (Page 2 of 3)

SCENARIO 1: 100 PERCENT MILITARY HOUSE HOLDS ON BASE

Arterial Street Length Required

[illegible] (199) + 5.5 (99) + 5.0 (99) = Residential-Related = 2,234 ft

1.76 (2234) = Community Total = 3,932 ft

Collector Street Length Required

[illegible] (199) + 17.25 (99) + 13.5 (99) = Residential-Related = 4,438 ft

1.1 (4438) = Community Total = 4,882 ft

Minor Street Length Required

47.[illegible] (199) + 22.0 (99) + 10.0 (99) = Residential-Related = 12,521 ft

1.1 (12,521) = Community Total = 13,773 ft

Cost of Constructing Street System

Arterial:	3,932 ($172)	= $676,304
Collectors:	4,882 ($ 85)	= $414,97[illegible]
Minor:	13,773 ($ 54)	= $743,742
Total		= $1,[illegible]
		= $1,850,[illegible]

SCENARIO 2: [illegible] PERCENT MILITARY OFF-BASE

Arterial Street Length Required

[illegible] (285) + [illegible] (142) + [illegible] (142) = Residential-Related = [illegible] ft

1.76 ([illegible]) = Community Total = [illegible] ft

Collector Street Length Required

[illegible] (285) + 17.25 (142) + [illegible] (142) = Residential-Related = [illegible] ft

1.1 ([illegible]) = Community Total = [illegible] ft

Minor Street Length Required

[illegible] = Residential-Related = [illegible]

[illegible] = Community Total = [illegible]

Table C-3. Estimated street facility costs per 1,000 direct operations employees. (Page 3 of 3)

SCENARIO 3: (Continued)

Costs of Constructing Street System

Arterials:	5,034 ($172)	=	$866,448
Collectors:	6,398 ($ 85)	=	$544,830
Minor:	19,733 ($ 54)	=	$1,065,582
	Total	=	$2,476,860
		=	$2,480,000

SCENARIO 3: 40 PERCENT MILITARY OFF-BASE

Arterial Street Length Required

6.3 (370) + 8.5 (185) + 5 (185) = Residential-Related = 4,183 ft

1.76 (4,163) = Community Total = 7,327 ft

Collector Street Length Required

7.3 (370) + 17.25 (185) + 13.5 (185) = Residential-Related = 8,279 ft

1.1 (8,279) = Community Total = 9,107 ft

Minor Street Length Required

47.3 (370) + 22 (185) + 10 (185) = Residential-Related = 23,310 ft

1.1 (23,310) = Community Total = 25,641 ft

Cost of Constructing Street System

Arterials:	7,327 ($172)	=	$1,260,244
Collectors:	9,107 ($ 85)	=	$774,095
Minor:	25,641 ($ 54)	=	$1,384,614
	Total	=	$3,418,953
		=	$3,420,000

Source: HDR Sciences, based on planning factors recommended by Marlin Williams "Urban Planning and Housing Consultant", [illegible] Impact Assessment: A Methodology Applied to [illegible] U.S. Department of Energy, Washington, D.C., 1979.

Table C-4. Estimated offbase school facility costs.

ASSUMPTIONS:	1) 26 pupils per 100 population			
	2) Facility size per pupil = 98 square feet			
	3) Costs = $56 per square foot			
SCENARIO 1:	100 PERCENT MILITARY ON-BASE			
	Off-base Population	= 1,096		
	Number of pupils	= .26 (1,096)	=	285
	Size of facility	= 98 (285)	=	27,930 sq ft
	Cost of facility	= 27,930 ($56)	=	$1,564,080
			≈	$1,550,000
SCENARIO 2:	20 PERCENT MILITARY OFF-BASE			
	Off-Base population	= 1,096 + 425	=	1,521
	Number of pupils	= .26 (1,521)	=	395
	Size of facility	= 98 (395)	=	38,710 sq ft
	Cost of facility	= $56 (38,710)	=	$2,167,760
			≈	$2,150,000
SCENARIO 3:	40 PERCENT MILITARY OFF-BASE			
	Off-base population	= 1,096 + 850	=	1,946
	Number of pupils	= .26 (1,946)	=	506
	Size of facility	= 98 (506)	=	49,588 sq ft
	Cost of facility	= $56 (49,588)	=	$2,776,928
			≈	$2,800,000

3330-1

Note: Onbase school facilities are included in construction personnel estimates for the operating bases and are excluded here to avoid double-counting.

Source: HDR Sciences, based on planning factors recommended by Murphy/Williams Urban Planning and Housing Consultants, Socioeconomic Impacts Assessment. A Methodology Applied to Synthetic Fuels. U.S. Department of Energy, Washington, D.C., 1978.

Table C-5. Estimated development costs to other public facilities.

POLICE:	ASSUME $48 PER CAPITA
	SCENARIO 1: 1,096 ($48) = $ 52,608
	SCENARIO 2: 1,521 ($48) = $ 73,008
	SCENARIO 3: 1,946 ($48) = $ 93,408
FIRE:	ASSUME $39 PER CAPITA
	SCENARIO 1: 1,096 ($39) = $ 42,744
	SCENARIO 2: 1,521 ($39) = $ 59,319
	SCENARIO 3: 1,946 ($39) = $ 75,894
GOVERNMENT ADMINISTRATION:	ASSUME $24 PER CAPITA
	SCENARIO 1: 1,096 ($24) = $ 26,304
	SCENARIO 2: 1,521 ($24) = $ 36,504
	SCENARIO 3: 1,946 ($24) = $ 46,704
HEALTH CARE:	ASSUME $286 PER CAPITA
	SCENARIO 1: 1,096 ($286) = $313,456
	SCENARIO 2: 1,521 ($286) = $435,006
	SCENARIO 3: 1,946 ($286) = $556,556
LIBRARIES:	ASSUME $50 PER CAPITA
	SCENARIO 1: 1,096 ($50) = $ 54,800
	SCENARIO 2: 1,521 ($50) = $ 76,050
	SCENARIO 3: 1,946 ($50) = $ 97,300

3331

Source: HDR Sciences, based on planning factors recommended by Murphy/Williams Urban Planning and Housing Consultants, Socioeconomic Impact Assessments, A Methodology Applied to Synthetic Fuels. U.S. Department of Energy, Washington, D.C., 1978.

Table C-6. Estimated utility development costs (Page 1 of 2).

Residential related (public)

Assumptions:	Single-family dwelling total	= $7,256 per unit	sanitary sewers storm sewers water	- - -	$1,337 2,339 3,580
	Multifamily dwelling total	= $3,134 per unit	sanitary sewers storm sewers water	- - -	$ 564 1,042 1,528
	Mobile home total	= $4,826 per unit	sanitary sewers storm sewers water	- - -	$ 887 1,565 2,374

Scenario 1: 199 ($7,256) + 99 ($3,134) + 99 ($4,826) = $2,231,984

Scenario 2: 285 ($7,256)+142 ($3,134)+142 ($4,826) = $3,198,280

Scenario 3: 370 ($7,256)+185 ($3,134)+185 ($4,826) = $4,157,320

Residential related (private)

Assumptions:	gas and electricity for single-family dwellings	-$778 per unit
	gas and electricity for multifamily dwellings	-$338 per unit
	gas and electricity for mobile homes	-$523 per unit

Scenario 1: 199 ($778) + 99 ($338) + 99 ($523) = $240,061

Scenario 2: 285 ($778) + 142($338) + 142($523) = $343,992

Scenario 3: 370 ($778) + 185($338) + 185($523) = $447,145

T3332/10-2-81/a

Table C-6. Estimated utility development costs (Page 2 of 2).

Nonresidential utilities

Assumption:	Residential-related costs		x 0.43 sanitary sewers x 0.23 storm sewers x 0.23 water x 0.23 gas and electric
Scenario 1:	Sanitary	= 0.1837 (2,231,984) (0.43)	= $176,307
	Storm	= 0.3236(2,231,984) (0.23)	= $166,122
	Water	= 0.4927 (2,231,984) (0.23)	= $252,931
	Gas/elec	= 240,061 (0.23)	= $ 55,214
Scenario 2:	Sanitary	= 0.1837 (3,198,280) (0.43)	= $252,635
	Storm	= 0.3236 (3,198,280) (0.23)	= $238,042
	Water	= 0.4927 (3,198,280) (0.23)	= $362,432
	Gas/elec	= 343,992 (0.23)	= $ 79,118
Scenario 3:	Sanitary	= 0.1837 (4,157,320) (0.43)	= $328,391
	Storm	= 0.3236 (4,157,320) (0.23)	= $309,421
	Water	= 0.4927 (4,157,320) (0.23)	= $471,112
	Gas/elec	= 447,145 (0.23)	= $102,843

System-wide utility development costs

Scenario 1:	Sanitary	(0.1837 (2,231,984) + 176,307) 0.44	= $257,982
	Water	(0.4927 (2,231,984) + 252,931) 0.09	= $121,737
	Gas/elec	(240,061 + 55,214) (0.33)	= $ 97,441
Scenario 2:	Sanitary	(0.1837 (3,198,290) + 252,635) 0.44	= $369,670
	Water	(0.4927 (3,198,280) + 362,432) 0.09	= $174,440
	Gas/elec	(343,992 + 79,118) 0.33	= $139,626
Scenario 3:	Sanitary	(0.1837 (4,157,320) + 328,391) 0.44	= $480,520
	Water	(0.4927 (4,157,320) + 471,112) 0.09	= $226,748
	Gas/elec	(447,145 + 102,843) 0.33	= $181,496

T3332/10-2-81/a

Source: HDR Sciences, based on planning factors recommended by Murphy/Williams Urban Planning and Housing Consultants Socioeconomic Impacts Assessment: A Methodology Applied to Synthetic Fuels, U.S. Department of Energy, Washington, D.C., 1978.

Table C-7. Estimated nonresidential building development (not related to percent military offbase) (Page 1 of 2).

Retail

Assumptions:	(1)	Retail sales	=	0.38 x total personnel income (assuming military purchase many items on base).
	(2)	Retail sales per square foot	=	$60.00
	(3)	Personal yearly income in 1978 dollars	=	Officers $21,238 Airmen 10,440 Civilian 12,305 Indirect 12,500
	(4)	Construction cost	=	$40 per square foot
Total income:	69 Officers ($21,238)		=	$ 1,465,422
	817 Airmen (10,440)		=	8,529,480
	114 Civilian (12,305)		=	1,402,770
	500 Indirect (12,500)		=	6,250,000
				$17,647,672
Total retail sales			=	$17,647,672 (0.38) = $6,706,115
Total square feet of retail space			=	6,706,115/$60 = 111,769 sq ft
Total cost of retail construction			=	$40 (111,769 sq ft) = $4,470,760

Services

Assumptions:	(1)	Services receipts	=	0.10 (total personal income)
	(2)	Services receipts per square foot	=	$30
	(3)	Construction costs	=	$40 per square foot
Total service receipts			=	$17,647,672 (0.05) = $882,384
Total square feet of space			=	$882,384/$30 = 29,413 sq ft
Total cost of space			=	29,413 sq ft ($40) = $1,176,520

T3333/10-2-81/a

Table C-7. Estimated nonresidential building development (not related to percent military offbase) (Page 2 of 2).

Office Space

Assumptions:	(1)	Office employment	=	0.30 (indirect employment)
	(2)	150 square feet per employee		
	(3)	Cost of construction	=	$40 per square foot
Total square feet of space required			=	0.30 (500 indirect employees (150 square feet per employee)
Total cost of space			=	22,500 ($40) = $900,000

T3333/10-2-81/a

Source: HDR Sciences, based on planning factors recommended by Murphy/Williams Urban Planning and Housing Consultants, Socioeconomic Impact Assessment: A Methodology Applied to Synthetic Fuels, U.S. Department of Energy, Washington, D.C., 1978. For salaries used in retail assumptions, USAF, TAB-A/1 Environmental Narratives, 6 USAF bases.

APPENDIX D

OVERVIEW OF THE REGIONAL INDUSTRIAL MULTIPLIER SYSTEM

INTRODUCTION

The total economic effect of a project is substantially greater than the direct cost of building and operating the facility since the total includes secondary economic effects as well as the initial investment. The additional, or secondary, effect is estimated through a multiplier relationship: the ratio between the total increase in economic activity as a result of a project and the initial project investment. The initial effect, known as the final-demand change, represents the change introduced into the economy by the project itself. The secondary effect is the sum of the additional economic activity generated in the region by the initial effect. The analyses are particularly important since economic stimulation and new jobs created are often the key benefits of the construction or operations phases of a project, while lost jobs are a major source of controversy when an ongoing project must be terminated.

During construction of a new power generating facility, for example, the initial economic effect is represented by expenditures for equipment and materials purchased from local manufacturers and distributors, and for labor. The local direct suppliers in turn purchase goods and services from other, secondary suppliers (for example, wholesalers). The secondary suppliers in turn rely on other suppliers farther removed from the project. These successive rounds of interindustry purchases and sales are the secondary economic effects of the project.

The size of the regional multiplier depends on the proportion of direct and indirect input requirements that can be supplied by the region's economy, which in turn depends on both the specific needs of the project and the ability of the regional economy to supply the inputs. Conceptually, therefore, there is a different multiplier for every specific combination of industry and site in the nation.

ALTERNATIVE METHODOLOGIES

Economists have developed several alternative means for estimating the total economic effect, given the initial effect. The three main approaches are the economic base model, the econometric model, and the input/output (or I/O) model.

The economic base model provides the simplest approach to estimating total economic effect. This model divides the regional economy into two sectors, one producing goods and services for export to other regions (called the export, or basic, sector), and one producing goods and services for local consumption (called the residentiary, or nonbasic, sector). The income earned (or employment) in the impact analysis requires identifying the initial change in the export sector. The product of this initial change and the multiplier is the total change in income (employment).

In the econometric model, the economy is represented by a set of interrelated equations describing the interactions among economic components. Time series data are assembled for the variables of the model, and regression analysis is used to

estimate the coefficients of the equations. The economic impact analysis usually involves introducing the initial change in the appropriate equation of the model and recalculating the other equations to obtain the total impact.

The I/O model describes the flows of goods and services to markets and between industries in a region. Each industry in the economy has a particular set of inputs required to produce its output, requirements that generally differ from those of other industries. The I/O model describes the structure of the economy and may be used to analyze the implications of the changes in one portion of the economic effects that are set off by the final-demand change. Implicit in this process is a multiplier that relates the total change to a specific initial change.

Each approach has advantages and disadvantages. The economic base model is simple to apply, but it fails to provide results tailored to the specific project being analyzed. Equal initial changes, whether in agriculture or energy supply, will produce equal total changes. The econometric model offers results that are moderately sensitive to differences in the nature of the project, but the data requirements for a long time series for all variables and the time required to assemble and estimate the model generally rule out its use, particularly for areas smaller than a state. The I/O model generally provides more useful industrial detail than the other two. However, while it does not require time series data, an I/O model is usually costly to construct, and applications involving regions smaller than a state are difficult, again because of data limitations.

RIMS MULTIPLIER

HDR-Sciences uses a variation of the I/O approach, known as the Regional Industrial Multiplier System (RIMS).* This system was developed to overcome the cost and/or small-area data limitations associated with traditional approaches, and to provide both geographic and industrial flexibility. It is a system of interrelated data files and computer programs designed to estimate I/O type regional multipliers for any of the industries specified in the Bureau of Economic Analysis (BEA) national I/O model, and for any region that can be defined as one or more counties in the United States.

The system combines several advantages of the economic base and I/O approaches to regional impact analysis to produce regional multipliers that are conceptually similar to I/O multipliers. RIMS relies on secondary data sources, is sensitive to differences between industries, operates at a detailed industrial level, and is relatively inexpensive to apply.

The regional multiplier estimates the portion of succeeding waves of expenditures that occur within a defined region, thus providing a measure of the increased economic activity within the region. RIMS estimates project-specific multipliers needed to estimate changes in regional gross output, regional employment, and regional earnings by first computing the study industry's dependence on other regional industries.

*The RIMS system was developed in the Regional Economic Analysis Division of the Bureau of Economic Analysis, U.S. Department of Commerce. The HDR version of RIMS has been refined and updated by staff to meet client and government requirements.

The relationship is used to estimate the multiplier effect of an increase in final demand in a given industry on the regional gross output. Earnings-to-gross-output ratios are then used to translate the output increase into increases in earnings. For any given region, the ratio of employment to earnings is used to obtain an estimate of the total increased employment within the region.

Each industry requires inputs that are converted to an output, which serves as input to other industries. For example, the manufacture of electric motors requires, as some of its inputs, copper, electricity, labor, and transportation. When the electric motors are completed (are an output) they are purchased by (become inputs to) the copper industry, the electric appliance industry, and others. Some of these suppliers and some of the consumers are located in the region of interest, while others are not. An I/O model ordinarily requires the development of an entire I/O matrix to account for this interdependence. While retaining many of the analytical opportunities of the I/O framework, RIMS avoids the need for this costly process by viewing the gross output multiplier as comprising four elements: the initial change, the direct effect, the indirect effect, and the induced effect.

The initial change component in the multiplier represents project expenditures that will occur in the study region. Since this initial change is exactly equal to project expenditures, it is always represented in the multiplier by unity (1.000). The remaining components, the secondary economic effects, are added to the initial economic effect to provide the total economic effect.

The direct effect component accounts for both the industry input requirements and the ability of the area to meet them. The former is obtained from the national I/O model; the latter is derived from data relating to the study region (U.S. Bureau of the Census, County Business Patterns Program). Inputs required by the study industry but not produced in the region (or produced in insufficient quantity) must be imported by the region, thus reducing the direct effect component of the regional multiplier.

The input requirements are identified in the BEA national I/O model. The first step in regionalization is the evaluation of this set of requirements in light of what is known about the project or specific industry. The suitability of the national model industry for the project analysis is assessed and project-specific adjustments made in the national model input requirements on the basis of available project descriptions or engineering information.

The input requirements that result from this first step represent the technical requirements of the industry. The second step in regionalization reconciles the technical requirements of the industry with the capacity of the region to supply the required inputs. The technical requirements are replaced by regional direct coefficients reflecting the actual purchases of inputs from suppliers within the study region. This step is accomplished with the use of the location quotient, which is a double ratio of the form:

$$\frac{\text{industry i employment in study region/total employment in study region}}{\text{industry i employment in the nation/total employment in the nation}}$$

County Business Patterns data are used to estimate these location quotients. If the location quotient for a given input is zero, no production is carried on in the

region. Thus, all the required input must be imported and the regional direct effect is zero. If the location quotient is equal to or greater than one, production in the region is assumed to be sufficient to supply the study industry, and the regional direct effect is equal to the national direct requirement. In cases where the location quotient is greater than zero but less than one, the region is assumed to supply some of the input requirement, the proportion being equal to the value of the location quotient.

The location quotient test is applied to each regional industry that potentially supplies inputs to the study industry. The sum of all the resulting regionalized coefficients is the direct component of the regional multiplier.

The indirect component and the induced component are computed as a single combined value in RIMS. The indirect-induced effects are those resulting from expansion of supplier and service industries to meet the needs of the directly affected industry, as well as changes in local consumption expenditures. The indirect interactions measure additional rounds of expenditures and production that result from the initial stimulus. Local consumer's incomes are increased by direct and indirect effects, and some part of the income increases will be spent in the region, stimulating additional economic activity. This effect of increased incomes to local consumers is the induced effect, and is an extension of the indirect component. Estimation of the indirect-induced component is possible through the finding that in an I/O model, under empirically common conditions, the indirect-induced component can be estimated as a linear homogeneous function of the direct component. A sample of 17 I/O models containing 500 observations was used to develop a relationship which is applied to all sectors of the regional economy.

UPDATED RIMS PROGRAM

Implementation of the RIMS methodology requires the articulation of several data bases. National input-output data - provided by the Bureau of Economic Analysis - must be coordinated with county business pattern employment figures - furnished by the Census Bureau. Because of the long time required to develop these data -- particularly the input-output study -- these data are unavoidably several years old by the time they are used.

In contrast to the 1967 tables, used in the initial development of RIMS, the latest (1972) national input-output tables did not produce interindustry direct requirement coefficients. Such coefficients must now be generated through appropriate combination of published "use" and "make" tables.

Each row of a use table shows the sales to each industry and to final users of the output of the commodity named at the beginning of the row. Each column shows the value of the input of commodities and the value added generated in production of the industry named at the head of the column. Each row of a make table reveals the value of each of the commodities produced by the industry named at the beginning of the row. The columns of a make table show the total output of each commodity produced in each industry.

Each industry is assumed to have its own technology, determined by its principal product; in other words all commodities, whether principal or subsidiary, produced in one industry are made by the same process and therefore require the

same input structure. This is referred to as the assumption of an industry technology (Stone, Bates, and Bacharach, 1963, p.13). (The assumption of a commodity technology, though perhaps preferable from a theoretical viewpoint, can yield negative coefficients and is not considered suitable for impact analysis.) Under this assumption, an input-output coefficient matrix (A) can be obtained as a matrix product of appropriately scaled versions of the use (U) and make (V) tables (United Nations, 1968, pp. 49-50). A = BD, where U = Bg and V = Dq. g is a diagonal matrix with industry outputs in the diagonal, and q is a diagonal matrix with commodity outputs in the diagonal. The industry technology was employed to compute an industry coefficients table, using the most disaggregated use and make tables (511 industries) available from the Bureau of Economic Analysis. The household coefficients were calculated as value added divided by total inputs. To extract employee compensation from value added - which consists of employee compensation, indirect business taxes and property-type income - value added was multiplied by the proportion of employee compensation in value added at the broad industrial division level.

To generate regional location quotients, one must know the relative proportions of employment in specific industries in the region to be investigated to those in the nation - since the input-output data are national in nature. Employment estimates for 4-digit SIC industries were obtained from County Business Pattern publications for the latest available year 1976. Since many figures are not revealed, due to disclosure rules, a reconciliation procedure was implemented to estimate employment for nonreported industries. This required hierarchically conforming employment estimates at one level of industrial classification to employment estimates at the next broader level. Since five levels of industrial classification exist, a computer subroutine was written to match any of four given levels with the level immediately above it.

Since the industrial classifications employed by the Bureau of Economic Analysis and the Census Bureau are disparate, a bridge program was written so that location quotients could be computed for each of the input-output industries. This was accomplished by taking the published bridge, (Ritz, Roberts, and Young, 1979, pp. 58-61) and rearranging (sorting) it so that SIC industries - as opposed to I/O industries - were in ascending order. This facilitated the assignment of County Business Pattern employment estimates to the appropriate I/O industries as data are read in from magnetic tape, in order of ascending SIC codes.

Once I/O industry regional employment estimates are obtained in this fashion, regional location quotients (LQs) - the ratios of regional to national industrial concentrations - are computed. These LQs are then applied to the national input-output coefficients - generated under the industry technology assumption - to calculate regional direct multipliers.

This procedure can be summarized in the following four equations. (The dot (.) refers to summing across that subscript.)

$$(1.1)\quad A^r_{ij} = (R_i)(A^n_{ij})$$

$$(1.2)\quad EC^r = -0.79P_1 - 0.13P_2 + 0.17S$$

$$(1.3)\quad C^r_{.j} = 0.65 + EC^r + 1.03 \log A^r_{.j}$$

$$(1.4)\quad M^{r}_{.j} = A^{r}_{.j} + C^{r}_{.j} + 1$$

where

A^{r}_{ij} = estimated regional direct coefficient

R_i = regionalizing factor for industry i

A^{n}_{ij} = national direct I-O coefficient

EC^{r} = factor describing the economic characteristics of the region

P_1 = agriculture proportion of total nongovernment earnings

P_2 = manufacturing proportion of total nongovernment earnings

S = regional nongovernment earnings divided by national nongovernment earnings--a measure of the economic size of the region

$C^{r}_{.j}$ = estimated indirect-induced component of the multiplier for industry j

$A^{r}_{.j}$ = estimated direct component of the multiplier for industry j

$M^{r}_{.j}$ = estimated total multiplier for industry j

Equation (1.1) shows the employment editing of the national table and the further regionalization by location quotients. Equation (1.3) indicates that the indirect-induced component of the multiplier is estimated as a function of both the direct component and regional economic characteristics, which are specified in (1.2). Equation (1.4) is the multiplier identity. One overall multiplier ($M^{r}_{.j}$) is estimated for each column industry. The multiplier represents the effect of a change in final demand for each column industry's output on the total regional output of goods and services, as well as the associated effects on regional earnings (Cartwright, 1979).

The County Business Patterns data do not provide enough information to estimate location quotients for the RIMS agricultural sections. It consequently is necessary to derive location quotients for the agricultural sectors using alternative data sources.

Table D-1 presents the correspondence between the RIMS agricultural sectors (numbered 1 through 19) and the 1974 Census of Agriculture reporting categories. These Census of Agriculture data are the basis for the location quotients for the agricultural sectors used in the RIMS model. The 1974 Census of Agriculture categories correspond fairly closely to the RIMS sectors for dairy products, poultry products, cattle and calves, hogs and pigs, sheeps, lambs and wool, and other livestock, cotton and cottonseed, grains, tobacco, fruits, nuts, and berries, vegetables, sweet corn and melons, forest products, and greenhouse and nursery products. No corresponding Census of Agriculture data are available for grass seeds, sugar crops, miscellaneous crops, oil-bearing crops, forestry and fishing products, and agriculture, forestry, and fishing services.

Table D-1. Correspondence between RIMS sectors and 1974 Census of Agriculture reporting categories.

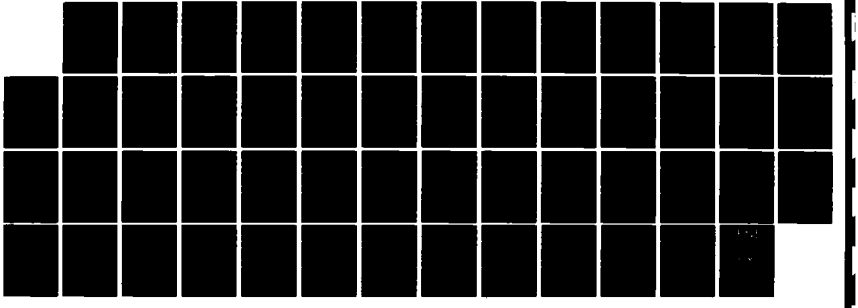
	RIMS Sector	1974 Census of Agriculture Reporting Category
1.	Dairy farm products	Dairy products
2.	Poultry and eggs	Poultry and poultry products
3.	Meat animals	Cattle and calves; hogs and pigs
4.	Miscellaneous livestock	Sheep, lambs, and wool; other livestock
5.	Cotton	Cotton and cottonseed
6.	Food grains	Grains
7.	Feed grains	Grains
8.	Grass seeds	n.a.
9.	Tobacco	Tobacco
10.	Fruits	Fruits, nuts, and berries
11.	Tree nuts	Fruits, nuts, and berries
12.	Vegetables	Vegetables, sweet corn, and melons
13.	Sugar crops	n.a.
14.	Miscellaneous crops	n.a.
15.	Oil bearing crops	n.a.
16.	Forest products	Forest products
17.	Greenhouse and nursery products	Greenhouse and nursery products
18.	Forestry and fishing products	n.a.
19.	Agriculture, forestry, and fishing services	n.a.

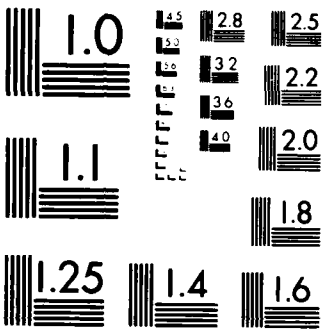
[5729/9-22-81]

Sources: U.S. Department of Commerce, Bureau of Economic Analysis, Survey of Current Business, April 1979, pp. 58-61; and U.S. Department of Commerce, Bureau of the Census, 1974 Census of Agriculture.

AD-A149 918 DEPLOYMENT AREA SELECTION AND LAND WITHDRAWAL/ACQUISITION M-X/MPS (M-X/MU.. (U) HENNINGSON DURHAM AND RICHARDSON SANTA BARBARA CA 02 OCT 81 3/3

UNCLASSIFIED M-X-ETR-27 F/G 16/1 NL





The agricultural sector LQ's were calculated as follows:

$$LQ_{ij} = \frac{\dfrac{\text{Sector i Sales in Region j (1974)}}{\text{Total Employment in Region j (1974)}}}{\dfrac{\text{Sector j Sales in Nation (1974}}{\text{Total Employment in Nation (1974)}}}$$

In this formulation, employment serves as a proxy for output, since total regional output estimates are not available.

As with normal method for LQ estimation, if $LQ_i > 1$ then $LQ_{ij} = 1$; if $1 < LQ_{ij} < 0$, then $LQ_{ij} = LQ_{ij}$.

County employment figures in Nevada and Utah are from the Nevada Employment Security Department and the Utah Department of Employment Security respectively. County employment data for New Mexico and Texas are from REIS data tape printout. The national employment data were taken from the Economic Report of the President. These data are presented in Table D-2.

Tables D-3 through D-5 present the data on market value of agricultural products sold in the United States, the Nevada/Utah ROI counties, and the Texas/New Mexico ROI counties, respectively. The estimated location quotients for the Nevada/Utah ROI counties are presented in Table D-6. Agriculture-sector LQ's for the Texas/New Mexico ROI counties are presented in Table D-7.

Table D-2. Total employment in ROI counties in Texas, New Mexico, Nevada, and Utah and in the United States, 1974 (Page 1 of 2).

Region	Number Employed
Texas	
Bailey	3,504
Castro	4,724
Cochran	2,038
Dallam	3,462
Deaf Smith	8,532
Hale	15,311
Hartley	1,453
Hockley	7343
Lamb	6,541
Lubbock	87,666
Moore	6,465
Oldham	1,027
Parmer	5,593
Potter/Randall	70,504
Sherman	2,447
Swisher	4,806
New Mexico	
Chaves	17,710
Curry	18,638
De Baca	958
Harding	652
Lea	21,876
Quay	4,640
Roosevelt	6,098
Union	2,144

T5730/9-25-81/F

Table D-2. Total employment in ROI counties in Texas, New Mexico, Nevada, and Utah and in the United States, 1974 (Page 2 of 2).

Region	Number Employed
Nevada	
Clark	135,200
Eureka	510
Lincoln	1,110
Nye	1,820
White Pine	4,060
Utah	
Beaver	1,778
Iron	5,734
Juab	1,910
Millard	3,023
Salt Lake/Utah	275,487
Washington	5,684
United States	85,935,000

T5730/9-25-81/F

Sources: Council of Economic Advisors, Economic Report of the President, Washington, D.C. 1981; U.S. Department of Commerce, Bureau of Economic Analysis 1980; Nevada Employment Security Department, 1981; Utah Department of Employment Security, 1981

Table D-3. U.S. total market value of agricutural products sold, 1974 (thousands of dollars).

RIMS Sector	Market Value of Agricultural Products Sold
1	$ 8,193,661
2	6,191,276
3	23,695,746
4	844,061
5	2,260,296
6	24,620,683
7	24,620,683
8[1]	-
9	1,670,391
10	2,935,001
11	2,935,001
12	2,338,949
13[1]	-
14[1]	-
15[1]	-
16	223,254
17	1,698,508
18[1]	-
19[1]	-

T5731/9-22-81

Source: U.S. Department of Commerce, Bureau of the Census ,1974 Census of Agriculture.

[1]These RIMS sectors do not have a corresponding sector in the census of agriculture data.

Table D-4. Market value of agricultural products sold, Nevada/Utah ROI counties, 1974 (thousands of dollars).

County	RIMS Sector																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Nevada																			
Clark	5,147	2	1,341	370	0	9	9	0	0	3	3	51	0	0	0	0	60	0	0
Eureka	0	0	2,108	121	0	396	396	0	0	0	0	0	0	0	0	0	0	0	0
Lincoln	230	0	1,488	4	0	20	20	0	0	0	0	0	0	0	0	0	0	0	0
Nye	8	5	1,747	19	470	0	0	0	0	0	0	0	0	0	0	0	5	0	0
White Pine	133	2	1,884	869	0	51	51	0	0	1	1	0	0	0	0	0	0	0	0
Utah																			
Beaver	2,001	0	2,436	58	0	312	312	0	0	0	0	0	0	0	0	0	2	0	0
Iron	202	1	3,667	1,388	0	1,454	1,454	0	0	0	0	6	0	0	0	0	0	0	0
Juab	123	1	1,405	277	0	686	686	0	0	0	0	0	0	0	0	0	0	0	0
Millard	3,102	97	11,908	640	0	2,813	2,813	0	0	5	5	1	0	0	0	0	0	0	0
Salt Lake/ Utah	8,361	15,109	9,311	3,789	0	5,399	5,399	0	0	3,935	3,935	1,245	0	0	0	19	3,072	0	0
Washington	905	450	1,781	39	0	1,061	0	0	0	197	197	34	0	0	0	0	7	0	0

T5732/9-22-81

Source: U.S. Department of Commerce, Bureau of Census, 1974 Census of Agriculture.

Table D-5. Market value of agricultural products sold, Texas/New Mexico ROI counties, 1974 (thousands of dollars).

County	RIMS Sector																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Texas	886	0																	
Bailey	286	0	27,615	0	3,882	11,396	11,396	0	0	0	0	790	0	0	0	0	0	0	0
Castro	1,193	3	139,548	2,095	3,869	45,885	45,885	0	0	4	4	916	0	0	0	0	0	0	0
Cochran	0	2	24,684	165	4,265	4,555	4,555	0	0	1	1	0	0	0	0	0	0	0	0
Dallam	0	3	42,718	7	0	20,580	20,580	0	0	0	0	0	0	0	0	0	0	0	0
Deaf Smith	284	8	215,035	11	437	35,860	35,860	0	0	0	0	1,122	0	0	0	0	0	0	0
Hale	645	3	66,862	170	14,603	49,347	49,347	0	0	0	0	1,904	0	0	0	0	5	0	0
Hartley	0	4	63,506	4	0	12,346	12,346	0	0	0	0	0	0	0	0	0	0	0	0
Hockley	0	8	10,790	268	14,536	6,226	6,226	0	0	0	0	111	0	0	0	0	33	0	0
Lamb	270	92	16,809	117	12,042	35,163	35,163	0	0	5	5	570	0	0	0	0	52	0	0
Lubbock	0	836	42,039	28	26,400	9,879	9,879	0	0	2	2	232	0	0	0	1	894	0	0
Moore	0	0	77,762	8	0	23,536	23,536	0	0	0	0	0	0	0	0	0	0	0	0
Oldham	0	2	31,023	49	0	2,038	2,038	0	0	0	0	6	0	0	0	0	0	0	0
Parmer	0	0	180,431	64	3,928	71,329	71,329	0	0	3	3	1,944	0	0	0	0	0	0	0
Potter/Randall	1,483	33	102,140	65	82	10,967	10,967	0	0	0	0	12	0	0	0	0	1,630	0	0
Sherman	0	3	74,344	58	0	27,626	27,626	0	0	0	0	0	0	0	0	0	0	0	0
Swisher	120	5	89,102	189	4,493	30,129	30,129	0	0	0	0	0	0	0	0	0	101	0	0
New Mexico																			
Chaves	2,848	8	59,698	4,241	6,387	669	669	0	0	267	267	203	0	0	0	0	0	0	0
Curry	2	7	37,303	121	154	20,493	20,493	0	0	0	0	11	0	0	0	1	40	0	0
De Baca	0	1	5,080	284	99	140	140	0	0	0	0	7	0	0	0	0	0	0	0
Harding	28	1	5,126	36	0	151	151	0	0	0	0	2	0	0	0	0	0	0	0
Lea	1,499	76	15,350	274	2,881	2,048	2,048	0	0	7	7	234	0	0	0	0	0	0	0
Quay	206	3	22,603	76	294	2,396	2,396	0	0	0	0	19	0	0	0	1	0	0	0
Roosevelt	4,419	370	20,516	242	1,298	7,466	7,466	0	0	1	1	71	0	0	0	0	0	0	0
Union	252	20	35,044	57	0	2,753	2,753	0	0	0	0	0	0	0	0	0	0	0	0

T5733/9-22-81

Source: U.S. Department of Commerce, Bureau of Census, 1974 Census of Agriculture.

Table D-6. Location quotients for RIMS agricultural sectors (Sectors 1-19), Nevada/Utah ROI counties.

County	RIMS Sector																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Nevada																			
Clark	0.40	0	0.04	0.28	0	0	0	0	0	0	0	0.01	0	0	0	0	0.02	0	0
Eureka	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Lincoln	0	0	1	0.37	0	0.06	0.06	0	0	0	0	0	0	0	0	0	0	0	0
Nye	0.05	0.04	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0.14	0	0
White Pine	0.34	0.01	1	1	0	0.04	0.04	0	0	0.01	0.01	0	0	0	0	0	0	0	0
Utah																			
Beaver	1	0	1	1	0	0.61	0.61	0	0	0	0	0	0	0	0	0	0.06	0	0
Iron	0.33	0	1	1	0	0.89	0.89	0	0	0	0	0.04	0	0	0	0	0	0	0
Juab	0.60	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Millard	1	0.45	1	1	0	1	1	0	0	0.05	0.05	0.01	0	0	0	0	0	0	0
Salt Lake/ Utah	0.32	0.76	0.12	0.69	0	0.07	0.07	0	0	1	1	0.17	0	0	0	0.03	0.56	0	0
Washington	1	1	1	1	0	0.65	0.65	0	0	0.42	0.42	0.22	0	0	0	0	0.06	0	0

T5734/9-22-81

Source: HDR Sciences, based on data from U.S. Bureau of Economic Analysis, Regional Economic Information System; U.S. Bureau of the Census, 1974 Census of Agriculture; and other agencies. See preceding tables.

Table D-7. Location quotients for RIMS agricultural sectors (Sectors 1-19), Texas/New Mexico ROI counties.

County	RIMS Sector																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Texas																			
Bailey	1	0	1	0	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0
Castro	1	0.01	1	1	1	1	1	0	0	0.02	0.02	1	0	0	0	0	0	0	0
Cochran	0	0.01	1	1	1	1	1	0	0	0.01	0.01	0	0	0	0	0	0	0	0
Dallam	0	0.01	1	0.21	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Deaf Smith	0.35	0.01	1	0.13	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Hale	0.44	0	1	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0
Hockley	0	0.02	1	1	1	1	1	0	0	0	0	0.56	0	0	0	0	0.36	0	0
Lamb	0.43	0.20	1	1	1	1	1	0	0	0.02	0.02	1	0	0	0	0	0	0	0
Lubbock	0	0.13	1	0.03	1	0.39	0.39	0	0	0	0	0.10	0	0	0	0	0.52	0	0
Moore	0	0	1	0.13	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Oldham	0	1	1	0	1	1	0	0	0	0	0	0.21	0	0	0	0	0	0	0
Parmer	0	0	1	1	1	1	1	0	0	0.02	0.02	1	0	0	0	0	1	0	0
Potter/Randall	0.38	0.01	1	0.16	0.08	0.94	0.94	0	0	0	0	0.01	0	0	0	0	0.02	0	0
Sherman	0	0.02	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0.10	0	0
Swisher	0.26	0.01	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0
New Mexico																			
Chaves	1	0.01	1	1	1	0.13	0.13	0	0	0.44	0.44	0.42	0	0	0	0	0	0	0
Curry	0	0.01	1	0.66	0.31	1	1	0	0	0	0	0.02	0	0	0	0.02	0.11	0	0
De Baca	0	0.01	1	1	1	0.51	0.51	0	0	0	0	0.27	0	0	0	0	0	0	0
Harding	0.45	0.02	1	1	0	0.81	0.81	0	0	0	0	0.11	0	0	0	0	0	0	0
Lea	0.72	0.05	1	1	1	0.33	0.33	0	0	0.01	0.01	0.39	0	0	0	0	0	0	0
Quay	0.47	0.01	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.15	0	0
Roosevelt	1	0.84	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0.43	0	0
Union	1	0.13	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0

T5735/9-22-81

Source: HDR Sciences, based on data from U.S. Bureau of Economic Analysis, Regional Economic Information System; U.S. Bureau of the Census, 1974 Census of Agriculture; and other agencies. See preceding tables.

APPENDIX E

CRAFT WAGE RATES PLUS EMPLOYER CONTRIBUTIOINS FOR SELECTED BENEFITS, NEVADA/UTAH, AUGUST 1978

Table E-1. LABOR PROJECT REQUIREMENTS

(PAGE 1 OF 6)

ESTIMATE A5928-04 MX VERIFIABLE HORIZ MPS
PRECAST CONSTRUCTION

CLASSIFICATION	TIME IN HOURS	RATE PER HOUR RATE A	RATE B	RATE C	RATE D	CLASS TOTAL	CRAFT TOTAL
CARPENTERS							
CARPENTER	1950776	14 02				27349879	
FOREMAN CARPENTER	608086	15 05				9151700	
FORM STRIPPER	584640	14 02				8196652	
FORM SETTER	584640	14 02				8196652	
CRAFT TOTAL	3728142						52894885
ELECTRICIANS							
ELECTRICIAN	2327321	17 79				41403037	
ELECTRICIAN FOREMAN	632795	19 41				12282554	
CRAFT TOTAL	2960116						53685592
IRONWORKERS							
FOREMAN-IRONWORKER	629458	16 96				10675614	
FOREMAN-RIGGER	473568	16 96				8031713	
IRONWORKER	1716058	16 13				27680009	
RIGGER	2999504	16 13				48381999	
IRONWORKER-REINFORCING	759534	16 09				12220908	
FOREMAN-IRONWORKER REINF	72778	16 96				1234308	
IRONWORKER GENL FOREMAN	113816	16 96				1930319	
IRONWORKER HELPER	1315584	13 60				17891942	
CRAFT TOTAL	8080300						128046815
LABORERS							
AIR TOOL OPERATOR	1864376	11 00				20508136	
CLEANUP MAN	111936	10 60				1186521	
DRILLER	944	11 55				10903	
DRILLER HELPER	944	11 00				10384	
DRILLING FOREMAN	944	11 03				10412	
DUMPMAN	111936	11 00				1231296	
FLAGMAN	180000	10 60				1908000	
FOREMAN LABOR	974898	11 03				10753120	

C10138

Table E-1. LABOR PROJECT REQUIREMENTS

ESTIMATE A5928-04 MX VERIFIABLE HORIZ MPS
PRECAST CONSTRUCTION

CLASSIFICATION	TIME IN HOURS	RATE PER HOUR RATE A	RATE B	RATE C	RATE D	CLASS TOTAL	CRAFT TOTAL
HELPER	592262	13.08				7746792	
HOSE TENDER	223872	11.00				2462592	
LABORER	14338160	10.60				51984496	
POT TENDER	55968	11.00				615648	
SANDBLASTER	223872	11.55				2585721	
PIPELAYER	381600	11.00				4197600	
CONCRETE LABORER	997314	11.00				10970458	
FOREMAN CONCRETE	48720	14.48				705465	
CRAFT TOTAL	20107746						216887547
CEMENT MASONS							
CONCRETE FINISHER	105736	13.98				1478189	
CRAFT TOTAL	105736						1478189
MILLWRIGHTS							
MILLWRIGHT	1090368	14.02				15286959	
MILLWRIGHT FOREMAN	223872	15.05				3369273	
CRAFT TOTAL	1314240						18656233
OPERATING ENGINEERS							
OPER TRENCHER	111936	16.23				1816721	
GRADE CHECKER	1558338	14.88				23188063	
OPER COMPRESSOR	197031	14.88				2931818	
OPER CRANE 35T	303460	18.46				5601871	
OPER FORKLIFT	169472	16.23				2750530	
OPER GROUT PUMP	111936	16.23				1816721	
OPER LOADER	854666	16.23				13871222	
OILER	1354323	14.88				20152329	
OILER DRIVER	1006857	14.88				14982029	
OPER PLANT	418758	16.23				6796448	
OPER PUMP	146160	16.23				2372176	
OPER BACKHOE	233092	18.46				4302878	
OPER CONVEYOR BELT	48720	16.23				790725	

CT0138

Table E-1. LABOR PROJECT REQUIREMENTS

ESTIMATE A5928-04 MX VERIFIABLE HORIZ MPS
PRECAST CONSTRUCTION

CLASSIFICATION	TIME IN HOURS	RATE PER HOUR RATE A	RATE B	RATE C	RATE D	CLASS TOTAL	CRAFT TOTAL
OPER DOZER	1212873	16.23				19684925	
OPER DOZER RIPPER	231612	16.23				3759062	
OPER MOTOR GRADER	1572119	16.23				25515494	
OPER ROLLER	1188208	16.23				19284615	
OPER SCRAPER	2881482	16.23				46766446	
OPER TRACTOR	51504	16.23				835909	
OPER TRUCK CRANE	776816	18.46				14340023	
OPER ASPHALT PAVER	41520	16.23				673869	
BRAKEMAN	90000	14.88				1339200	
MECHANIC FOREMAN	97440	16.78				1635043	
MECHANIC, HEAVY DUT	453859	16.23				7366134	
FOREMAN	2157532	16.78				36203386	
OPER CONCRETE PUMP	48720	16.23				790725	
WELDER	4067774	16.23				66019978	
MASTER MECHANIC	30000	16.78				503400	
OPER TIPPER	48720	16.23				790725	
FIREMAN	148051	14.88				2203001	
OPER HYDR CRANE	979835	18.46				18087757	
OPERATOR	778485	16.23				12634808	
OPER BATCH PLANT	48720	18.46				899371	
OPER GENERATOR	270960	16.23				4397680	
OPER COMPACTOR, ANYTYPE	446355	16.23				7244344	
OPER FRONT END LDR -5CY	191531	16.23				3108551	
OPER LOCOMOTIVE	90000	16.23				1460700	
OPER GRADALL	14112	16.23				229037	
GENERAL FOREMAN	48720	16.78				817521	
CRAFT TOTAL	24481697						397965255
PAINTERS							
PAINTER FOREMAN	56073	14.00				794219	
PAINTER	423214	15.00				6348204	
CRAFT TOTAL	480006						7144423

CT0138

Table E-1. LABOR PROJECT REQUIREMENTS

ESTIMATE A5928-04 MX VERIFIABLE HORIZ. MPS
PRECAST CONSTRUCTION

CLASSIFICATION	TIME IN HOURS	RATE PER HOUR RATE A	RATE B	RATE C	RATE D	CLASS TOTAL	CRAFT TOTAL
PILEDRIVERMEN							
PILE DRIVER	2518776	14.02				35313239	
FOREMAN PILE DRIVER	503755	15.05				7581515	
PILE DRIVER HELPER	671702	13.00				8732131	
CRAFT TOTAL	3694234						51626886
PIPEFITTERS							
PIPEFITTER	784616	16.18				12695086	
FOREMAN PIPEFITTER	151824	17.41				2643255	
CRAFT TOTAL	936440						15338343
PLASTERERS							
PLASTERER	2051	13.98				28675	
CRAFT TOTAL	2051						28676
PLUMBERS							
FOREMAN PLUMBER	14861	17.41				258726	
PLUMBER	134197	16.18				2171304	
CRAFT TOTAL	149058						2430031
TEAMSTERS							
DISPATCHER	66192	12.14				803570	
DRIVER BOTTOM DUMP	985770	12.45				12272831	
DRIVER BUS	670464	12.05				8079091	
DRIVER CEMENT TRK	487200	12.45				6065640	
DRIVER FLATBED TRK	1548700	12.05				18661835	
DRIVER HEAVY TRANSPORTER	293424	16.23				4762271	
DRIVER LOWBOY	478136	12.45				5952793	
DRIVER REAR DUMP	496998	12.45				6187630	
FOREMAN TEAMSTER	470442	12.77				6007539	
DRIVER TRUCK	279840	12.05				3372072	

CT0138

Table E-1. LABOR PROJECT REQUIREMENTS

ESTIMATE A5928-04 MX VERIFIABLE HORIZ MPS
PRECAST CONSTRUCTION

CLASSIFICATION	TIME IN HOURS	RATE PER HOUR RATE A	RATE B	RATE C	RATE D	CLASS TOTAL	CRAFT TOTAL
DRIVER WATER TRK	2362627	12.45				29414708	
WAREHOUSEMAN	310320	12.14				3767284	
DRIVER TRANSIT MIX	328608	12.45				4091169	
DRIVER DUMP TRK 10-20 CY	201600	12.45				2509920	
DRIVER DUMP TRK >20CY	1115347	12.45				13886072	
DRIVER DISTRIBUTOR TRK	216374	12.45				2693861	
GENERAL FOREMAN TEAMSTER	23880	17.50				417900	
CRAFT TOTAL	10335922						128946192
TILESETTERS							
TILESETTER	87115	13.98				1217870	
CRAFT TOTAL	87115						1217871
TUNNEL AND SHAFT WORKER							
BULL GANG FOREMAN	30000	11.03				330900	
BULL GANG LABORER	180000	10.60				1908000	
CRAFT TOTAL	210000						2238900
CAMP OPERATION							
PURCHASING AGENT	263760	16.86				4446993	
CLERK TYPIST	2751402	13.49				37116418	
TIMEKEEPER	10320	12.14				125284	
FOREMAN-FIELD	54240	16.78				910147	
FOREMAN-SHOP	29160	16.78				489304	
FOREMAN-WAREHOUSE	90000	12.77				1149300	
HELPERS	300000	12.05				3615000	
WAITERS	4594567	4.75				21824194	
HOUSEKEEPERS	7906930	6.00				47441577	
SHOP CRAFTS	165480	16.23				2685740	
FIELD CRAFTS	81360	16.23				1320472	
KITCHEN HELP	10435722	8.00				83485779	
CRAFT TOTAL	26682942						204610213

CT0138

Table E-1. LABOR PROJECT REQUIREMENTS

(PAGE 6 OF 6)

ESTIMATE A5928-04 MX VERIFIABLE HORIZ. MPS PRECAST CONSTRUCTION

CLASSIFICATION	TIME IN HOURS	RATE PER HOUR RATE A	RATE B	RATE C	RATE D	CLASS TOTAL	CRAFT TOTAL
SECURITY							
GUARD	90000	5.80				522000	
PATROLMAN	1344984	5.80				7800907	
LEADMAN	403200	6.38				2572416	
SITE SUPERVISOR	311340	7.00				2179380	
SITE SUPERVISOR ASSISTANT	114240	6.33				723139	
CLERK	652872	5.33				3479807	
CAPTAIN	61248	10.00				612480	
LIEUTENANT	61248	8.67				531020	
TRAINING OFFICER	78144	6.67				521220	
DIRECTOR OF SECURITY	16896	16.66				281487	
OPERATIONS OFFICER	16896	13.33				225223	
GENERAL MANAGER	23528	23.00				541144	
SITE MANAGER	86648	20.00				1732960	
Q C MANAGER	140240	17.00				2384080	
SCHEDULER	15840	17.00				269280	
EXPEDITER	63360	12.00				760320	
CRAFT TOTAL	3480684						25136866
ESTIMATE TOTAL	106836510						1308332917

SOURCE: R M. PARSONS AND CO., M-X VERIFIABLE HORIZONTAL MPS CONSTRUCTION CONCEPTS INVESTIGATION: OPERATIONAL CONSTRUCTION COST ESTIMATE, JANUARY 1981, "LABOR-PROJECT REQUIREMENTS."

CT0138

Table E-2. Labor hours required, hourly rates, and payrolls for selected DDA facility construction workers: security, clerical, professional, and managerial occupations.

Occupation		Hours Required	Hourly Rate (1978 $/hour)	Payroll (1978 $)
Security				
	Guard	90,000	$ 5.80	$ 522,000
	Patrolman	1,344,984	5.80	7,800,907
	Leadman	403,200	6.38	2,572,416
	Site supervisor	311,340	7.00	2,179,380
	Site supervisor assistant	114,240	6.33	723,139
	Captain	61,248	10.00	612,480
	Lieutenant	61,248	8.67	531,220
	Operations officer	16,896	13.33	225,223
	Director of security	16,896	16.66	281,487
	Total or average	2,498,196	6.39	15,969,272
Clerical,Professional,Managerial	Clerk	652,872		5.33
	General manager	23,528	23.00	541,144
	Site manager	86,648	20.00	1,732,960
	Q.C. manager	140,240	17.00	2,384,080
	Scheduler	15,840	17.00	269,280
	Expediter	63,360	12.00	760,320
	Total or average	982,488	9.33	9,167,591

T5740/9-25-81/F

Source: R. M. Parsons and Co., M-X Verifiable Horizontal MPS Construction Concepts Investigation: Operational Construction Cost Estimate, January 1981, "Labor-Project Requirements."

APPENDIX F

Table F-1. CAMP PAYROLL EXPENDITURES PER COMMUNITY (THOUSANDS OF FY 1980 $) Nevada/Utah Full Deployment Proposed Action and Alternatives 1, 2, 4, and 6

COUNTY & COMMUNITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CLARK CO., NEV. (LAS VEGAS)	3416	14416	36316	72530	86183	73316	50267	21495	188	0	0	0	0
WASHOE CO., NEV (RENO)	208	865	2497	5508	10333	15818	18510	10473	120	0	0	0	0
SALT LAKE CO., UT	2894	12052	29766	60919	77989	79799	72292	43405	300	0	0	0	0
SALT LAKE CITY	2106	8778	21940	44934	58380	61392	55509	33067	221	0	0	0	0
PROVO	787	3274	7826	15984	19608	18407	16782	10338	78	0	0	0	0
MILLARD CO., UT	1431	5941	14162	28350	29611	23276	10121	4837	4	0	0	0	0
LYNNDYL	108	451	1129	2252	2550	2090	918	420	0	0	0	0	0
DELTA	866	3593	8478	16968	17457	13624	5693	2661	2	0	0	0	0
FILLMORE	457	1897	4555	9130	9604	7562	3510	1756	2	0	0	0	0
BEAVER CO., UT (MILFORD)	888	3677	8017	15687	14980	4209	893	331	2	0	0	0	0
IRON CO., UT	273	1147	2610	5280	5299	2654	1819	967	7	0	0	0	0
BERYL	26	111	246	503	474	188	122	71	0	0	0	0	0
CEDAR CITY	247	1036	2364	4777	4825	2466	1697	896	7	0	0	0	0
LINCOLN CO., NEV (CALIENTE)	2634	11507	25063	57832	42701	8897	3787	1509	13	0	0	0	0
WHITE PINE CO., NEV (ELY)	247	1019	2936	6575	14578	29293	47537	35051	307	0	0	0	0
EUREKA CO., NEV (EUREKA)	6	28	74	1782	9576	22932	47829	33071	433	0	0	0	0
LANDER CO., NEV (AUSTIN)	2	9	24	113	338	732	1146	636	9	0	0	0	0
NYE CO., NEV (TONOPAH)	1463	5961	19873	46874	86729	127426	85181	41930	434	0	0	0	0
JUAB CO., UT	118	490	1949	4270	9086	13108	14853	9100	3	0	0	0	0
EUREKA	16	70	304	708	1696	3152	3519	1730	0	0	0	0	0
NEPHI	101	420	1644	3562	7390	11955	11334	7370	2	0	0	0	0
WASHINGTON CO., UT (ST. GEORGE)	194	815	1951	3934	4431	3235	2548	1349	12	0	0	0	0
TOTALS	13772	57927	145237	309653	391833	406694	356782	204154	1830	0	0	0	0

Table F-2. CAMP PAYROLL EXPENDITURES PER COMMUNITY (THOUSANDS OF FY 1980 $) Nevada/Utah Full Deployment Alternatives 3 and 5

COUNTY & COMMUNITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CLARK CO., NEV. (LAS VEGAS)	1648	16181	39197	75441	87577	69168	38438	22026	0	0	0	0	0
WASHOE CO., NEV (RENO)	190	1327	4408	9915	14416	18167	13900	1910	0	0	0	0	0
SALT LAKE CO., UT	3941	13523	26119	73212	84804	73102	75451	33038	0	0	0	0	0
SALT LAKE CITY	3178	10244	19126	54921	63444	54877	58053	26412	0	0	0	0	0
PROVO	763	3278	6993	18290	21359	18224	17397	6625	0	0	0	0	0
MILLARD CO., UT	2408	6680	8842	34377	26424	12795	25098	10384	0	0	0	0	0
LYNNDYL	217	630	869	3206	2358	902	1800	801	0	0	0	0	0
DELTA	1347	3783	5054	19726	15269	7886	15372	6131	0	0	0	0	0
FILLMORE	844	2267	2919	11445	8797	4007	7926	3452	0	0	0	0	0
BEAVER CO., UT (MILFORD)	2860	5324	3632	16809	16277	3364	2254	586	0	0	0	0	0
IRON CO., UT	543	1413	1822	5383	5589	2595	1777	1040	0	0	0	0	0
BERYL	49	126	154	473	483	194	154	111	0	0	0	0	0
CEDAR CITY	494	1287	1668	4910	5106	2401	1623	929	0	0	0	0	0
LINCOLN CO., NEV (CALIENTE)	330	5725	12629	26317	29640	13438	22251	31463	0	0	0	0	0
WHITE PINE CO., NEV (ELY)	149	1540	10948	19636	35243	51039	16447	1627	0	0	0	0	0
EUREKA CO., NEV (EUREKA)	6	37	4029	11482	16653	39004	39879	2907	0	0	0	0	0
LANDER CO., NEV (AUSTIN)	1	11	56	284	468	828	1257	129	0	0	0	0	0
NYE CO., NEV (TONOPAH)	47	10834	44443	56289	95506	103567	59592	42542	0	0	0	0	0
JUAB CO., UT	192	553	942	4590	7369	7236	19921	14562	0	0	0	0	0
EUREKA	14	60	250	850	1823	2000	3655	2583	0	0	0	0	0
NEPHI	178	493	692	3739	5546	5235	16265	11978	0	0	0	0	0
WASHINGTON CO., UT (ST. GEORGE)	202	949	1895	4415	4749	3154	2033	907	0	0	0	0	0
TOTALS	12517	64076	158962	338148	424714	377455	318296	163119	0	0	0	0	0

Table F-3, CAMP PAYROLL EXPENDITURES PER COMMUNITY NEVADA/UTAH SPLIT DEPLOYMENT

(THOUSANDS OF FY 1980 $)

COUNTY & COMMUNITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CLARK CO ,NEV (LAS VEGAS)	2474	8659	19104	50801	54843	41274	53538	34832	484	0	0	0	0
WASHOE CO ,NEV (RENO)	64	402	1163	2736	3712	3683	5060	3581	43	0	0	0	0
SALT LAKE CO ,UT	642	5086	15836	36880	46624	45918	28673	11873	114	0	0	0	0
SALT LAKE CITY	485	3509	11283	26548	34000	35589	22238	9124	85	0	0	0	0
PROVO	156	1577	4552	10332	12623	10329	6435	2749	29	0	0	0	0
MILLARD CO. ,UT	12	81	8835	16854	34468	61918	70846	42927	540	0	0	0	0
LYNNDYL	9	26	5137	9297	20797	37784	62767	42840	540	0	0	0	0
DELTA	0	9	439	921	1669	2796	932	13	0	0	0	0	0
FILLMORE	3	46	3259	6636	12002	21338	7147	74	0	0	0	0	0
BEAVER CO ,UT (MILFORD)	4	40	1806	3762	6789	11572	3887	70	0	0	0	0	0
IRON CO ,UT	26	2736	6217	15267	15059	10108	1771	141	1	0	0	0	0
BERYL	14	2652	6039	14808	14607	9878	1672	108	1	0	0	0	0
CEDAR CITY	12	84	178	459	452	230	99	33	0	0	0	0	0
LINCOLN CO ,NEV (CALIENTE)	93	753	1648	4183	4258	2498	1365	705	9	0	0	0	0
WHITE PINE CO ,NEV (ELY)	4101	12425	18596	57792	46955	3388	4267	2841	37	0	0	0	0
EUREKA CO ,NEV (EUREKA)	23	364	1336	2833	4124	4176	5890	3724	40	0	0	0	0
LANDER CO ,NEV (AUSTIN)	1	14	41	94	119	92	100	57	0	0	0	0	0
NYE CO ,NEV (TONOPAH)	0	4	12	30	37	32	42	26	0	0	0	0	0
JUAB CO ,UT	5	58	505	1077	1743	2670	796	108	1	0	0	0	0
EUREKA	1	12	71	151	221	321	129	20	0	0	0	0	0
NEPHI	3	45	433	926	1522	2349	866	87	0	0	0	0	0
WASHINGTON CO ,UT (ST GEORGE)	80	506	1234	3003	3401	2140	1052	1060	14	0	0	0	0

Table F-4. (Page 1 of 3)

Texas/New Mexico Full Deployment

CAMP PAYROLL EXPENDITURES PER COMMUNITY

(THOUSANDS OF FY 1980 $)

COUNTY & COMMUNITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
OKLAHOMA													
OKLAHOMA CO (OKLAHOMA CITY)	403	1821	4319	9528	11440	11900	9294	4613	46	0	0	0	0
CIMARRAN CO (BOISE CITY)	4	39	116	292	326	435	321	61	0	0	0	0	0
TEXAS CO (GUYMAN)	13	141	405	1025	1119	1481	1101	220	2	0	0	0	0
TEXAS													
DALLAM CO (DALHART)	13	3052	8796	21689	20977	28764	16039	1335	3	0	0	0	0
HARTLEY CO (DALHART/HARTLEY)	13	3052	8796	21689	20977	28764	16039	1335	3	0	0	0	0
SHERMAN CO (STRATFORD)	5	313	1527	4754	5481	8500	7286	509	0	0	0	0	0
MOORE CO (DUMAS)	34	966	2643	6117	6334	8136	4757	826	9	0	0	0	0
POTTER/RANDALL CO.S	773	4309	11522	26623	36504	47344	48536	30316	667	0	0	0	0
AMARILLO	723	4063	10887	25186	34512	44902	45969	28534	643	0	0	0	0
CANYON	50	245	634	1436	1991	2442	2566	1781	24	0	0	0	0
DEAF SMITH CO (HEREFORD)	125	509	2303	6329	12537	20677	26239	16648	515	0	0	0	0
SWISHER CO (TULIA)	19	84	210	476	729	934	1594	1630	9	0	0	0	0
PARMER CO (FARWELL)	139	536	1920	4563	9359	13519	14361	10835	13	0	0	0	0
BAILEY CO (MULESHOE)	460	2496	6442	10870	13611	3912	1679	1259	2	0	0	0	0
LAMB CO	97	380	928	1839	2578	2255	2201	1681	4	0	0	0	0
LITTLEFIELD	62	239	576	1134	1569	1296	1038	657	2	0	0	0	0
OLTON	17	69	172	350	500	497	604	526	1	0	0	0	0
EARTH	18	72	180	355	509	462	559	498	1	0	0	0	0

Table F-4. (Page 2 of 3)

Texas/New Mexico Full Deployment

CAMP PAYROLL EXPENDITURES PER COMMUNITY

(THOUSANDS OF FY 1980 $)

COUNTY & COMMUNITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TEXAS													
LUBBOCK CO.	1087	4303	9930	19591	24958	17964	14485	9648	78	0	0	0	0
LUBBOCK	1045	4135	9540	18812	23972	17235	13904	9274	77	0	0	0	0
SLATON	26	102	235	471	595	445	356	229	1	0	0	0	0
WOLFFORTH	6	26	62	127	163	125	103	66	0	0	0	0	0
SHALLOWATER	10	40	93	181	228	159	122	79	0	0	0	0	0
HALE CO.	126	506	1189	2436	3186	2854	3328	2845	20	0	0	0	0
ABERNATHY	10	40	95	199	259	231	249	201	1	0	0	0	0
PLAINVIEW	105	427	1004	2054	2693	2411	2848	2454	18	0	0	0	0
HALE CENTER	9	38	89	182	234	210	230	188	0	0	0	0	0
FLOYD CO.	48	232	572	1052	1309	740	597	425	2	0	0	0	0
LOCKNEY	9	37	86	175	220	189	185	138	1	0	0	0	0
FLOYDADA	14	57	132	272	343	303	285	197	1	0	0	0	0
PETERSBURG	25	138	354	605	746	248	127	90	0	0	0	0	0
LYNN CO. (TAHOKA)	10	40	92	190	244	197	161	105	0	0	0	0	0
TERRY CO (BROWNFIELD)	43	178	415	838	1098	776	606	411	2	0	0	0	0
YOAKUM CO. (PLAINS)	7	36	87	179	243	163	124	89	0	0	0	0	0
HOCKLEY CO (LEVELLAND)	95	407	958	1814	2323	1297	904	595	3	0	0	0	0
COCHRAN CO. (MORTON)	115	622	1485	2927	3847	1027	353	238	1	0	0	0	0
EL PASO CO. (EL PASO)	244	1077	2460	5395	6659	6102	4580	2493	12	0	0	0	0
TARRANT (DALLAS/FT WORTH)	484	1945	4434	9423	11540	10367	8198	4531	34	0	0	0	0
OLDHAM CO (VEGA)	6	28	148	420	895	1568	2201	1497	66	0	0	0	0
CASTRO CO (DIMMITT)	31	135	395	1131	2695	4785	11544	13593	10	0	0	0	0

Table F-4. (Page 3 of 3)

Texas/New Mexico Full Deployment

CAMP PAYROLL EXPENDITURES PER COMMUNITY

(THOUSANDS OF FY 1980 $)

COUNTY & COMMUNITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
NEW MEXICO													
QUAY CO.	2734	5585	9013	13721	12691	12947	7090	3391	4	0	0	0	0
LOGAN	295	623	1020	1912	2204	2685	2342	1163	0	0	0	0	0
TUCUMCARI	2439	4962	7993	11809	10487	10262	4748	2228	4	0	0	0	0
GUADALUPE CO.	19	73	155	326	394	358	260	130	0	0	0	0	0
SANTA ROSA	15	59	126	266	321	293	214	105	0	0	0	0	0
VAUGHN	4	14	29	60	73	65	46	25	0	0	0	0	0
CURRY CO. (CLOVIS)	2036	6343	13033	23990	29408	14996	8368	5777	21	0	0	0	0
DEBACA CO. (FT. SUMNER)	267	774	1498	2688	3102	1028	107	63	0	0	0	0	0
ROOSEVELT CO. (PORTALES)	1509	6996	15643	31765	41537	9501	1353	865	4	0	0	0	0
CHAVES CO.	228	1008	2246	9466	15136	21099	20751	16734	5	0	0	0	0
ROSWELL	220	973	2169	9221	14771	20689	20364	16431	5	0	0	0	0
HAGERMAN	3	17	39	120	179	194	182	142	0	0	0	0	0
DEXTER	3	16	37	123	185	214	204	160	0	0	0	0	0
EDDY CO.	72	289	645	1446	1904	1609	1298	882	2	0	0	0	0
CARLSBAD	45	182	407	898	1170	974	776	518	1	0	0	0	0
ARTESIA	26	107	238	548	734	635	521	363	0	0	0	0	0
SANTA FE CO. (SANTA FE)	78	315	696	1496	1804	1715	1260	631	4	0	0	0	0
BERNALILLO CO. (ALBUQUERQUE)	518	2080	4597	9877	11919	11333	8335	4173	28	0	0	0	0
LEA CO.	173	731	1688	3613	4961	3617	2784	1981	5	0	0	0	0
TATUM	8	37	89	201	297	224	181	138	0	0	0	0	0
LOVINGTON	53	231	539	1162	1620	1169	906	661	1	0	0	0	0
HOBBS	111	461	1059	2249	3043	2222	1697	1180	3	0	0	0	0
UNION CO. (CLAYTON)	8	193	724	2063	2094	3227	2135	192	1	0	0	0	0
HARDING CO.	0	0	0	2563	5505	8799	11279	5503	0	0	0	0	0
TOTALS	12030	51588	122027	264199	331421	314884	261544	148053	1572	0	0	0	0

Table F-5. CAMP PAYROLL EXPENDITURES PER COMMUNITY, TEXAS/NEW MEXICO SPLIT DEPLOYMENT

(THOUSANDS OF FY 1980 $)

COUNTY & COMMUNITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
OKLAHOMA													
OKLAHOMA CO (OKLAHOMA CITY)	16	515	1613	8307	10045	23287	32727	5920	6	0	0	0	0
CIMARRON CO (BOISE CITY)	48	994	1619	4632	7168	6758	5915	4165	63	0	0	0	0
TEXAS CO (GUYMAN)	0	14	23	73	125	145	159	193	3	0	0	0	0
TEXAS													
DALLAM CO (DALHART)	0	23	38	125	210	253	267	301	4	0	0	0	0
HARTLEY CO (DALHART/HARTLEY)	0	23	38	125	210	253	267	301	4	0	0	0	0
SHERMAN CO (STRATFORD)	1	246	421	1855	5190	7940	13955	22095	469	0	0	0	0
MOORE CO (DUMAS)	1	246	421	3684	6562	13206	14013	14112	124	0	0	0	0
POTTER/RANDALL CO S	16	299	822	4161	7217	13334	14418	939	14	0	0	0	0
AMARILLO	14	260	758	3965	6907	13013	14121	798	12	0	0	0	0
CANYON	2	39	64	195	310	321	296	141	2	0	0	0	0
DEAF SMITH CO (HEREFORD)	12	190	298	816	1290	966	756	254	3	0	0	0	0
SWISHER CO (TULIA)	7	118	182	477	730	475	316	129	1	0	0	0	0
PARMER CO (FARWELL)	1	25	40	111	173	136	108	44	0	0	0	0	0
BAILEY CO (MULESHOE)	101	1962	3179	8685	12718	10605	8748	3666	45	0	0	0	0
LAMB CO	12	207	333	954	1497	1317	1164	564	7	0	0	0	0
LITTLEFIELD	10	175	281	805	1262	1116	987	475	7	0	0	0	0
OLTON	1	16	26	76	120	106	95	45	0	0	0	0	0
EARTH	1	16	26	73	115	95	82	44	0	0	0	0	0

Table F-5. CAMP PAYROLL EXPENDITURES PER COMMUNITY, TEXAS/NEW MEXICO SPLIT DEPLOYMENT
(page 2 of 3)

(THOUSANDS OF FY 1980 $)

COUNTY & COMMUNITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
TEXAS													
LUBBOCK CO	5	156	264	752	1057	1033	955	320	2	0	0	0	0
LUBBOCK	1	25	41	118	165	164	149	70	1	0	0	0	0
SLATON	1	21	35	100	145	136	124	46	0	0	0	0	0
WOLFFORTH	3	91	154	436	601	588	542	167	1	0	0	0	0
SHALLOWATER	0	19	34	98	126	145	144	37	0	0	0	0	0
HALE CO	83	1724	2820	7948	11830	10828	9362	5316	71	0	0	0	0
ABERNATHY	0	10	17	53	83	82	75	35	0	0	0	0	0
PLAINVIEW	26	635	1056	3006	4367	4236	3730	2072	26	0	0	0	0
HALE CENTER	55	1078	1745	4888	7379	6509	5556	3208	44	0	0	0	0
FLOYD CO	10	450	779	2095	2810	2756	2135	397	3	0	0	0	0
LOCKNEY	7	173	284	751	1051	846	638	234	2	0	0	0	0
FLOYDADA	3	260	441	1045	1234	891	387	84	0	0	0	0	0
PETERSBURG	0	17	54	299	525	1019	1110	79	1	0	0	0	0
LYNN CO (TAHOKA)	3	58	101	317	506	572	541	189	2	0	0	0	0
TERRY CO (BROWNFIELD)	46	855	1316	3178	4742	2248	208	172	1	0	0	0	0
YOAKUM CO (PLAINS)	382	4038	5640	13886	23901	7210	945	713	7	0	0	0	0
HOCKLEY CO (LEVELLAND)	1	40	64	174	261	205	135	89	1	0	0	0	0
COCHRAN CO (MORTON)	0	9	14	39	60	46	36	21	0	0	0	0	0
EL PASO CO (EL PASO)	82	3769	6220	14457	17680	10445	3026	332	3	0	0	0	0
TARRANT (DALLAS/FT WORTH)	0	9	21	87	108	207	274	52	0	0	0	0	0
OLDHAM CO (VEGA)	4	161	208	824	1041	1185	1182	273	1	0	0	0	0
CASTRO CO (DIMMITT)	9	299	521	1477	1935	2051	1975	541	4	0	0	0	0

Table F-5. CAMP PAYROLL EXPENDITURES PER COMMUNITY, TEXAS/NEW MEXICO SPLIT DEPLOYMENT
(page 3 of 3)

(THOUSANDS OF FY 1980 $)

COUNTY & COMMUNITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
NEW MEXICO													
QUAY CO	4	146	245	1254	2655	4302	5855	7715	132	0	0	0	0
LOGAN	0	19	31	122	524	731	1637	2928	65	0	0	0	0
TUCUMCARI	4	127	214	1132	2131	3571	4218	4787	67	0	0	0	0
GUADALUPE CO	91	1979	3495	11951	19431	25094	24735	11774	167	0	0	0	0
SANTA ROSA	86	1867	3305	11342	18431	23960	23650	11236	160	0	0	0	0
VAUGHN	5	112	190	609	980	1134	1085	538	7	0	0	0	0
CURRY CO (CLOVIS)	5	95	149	402	614	445	331	140	1	0	0	0	0
DE BACA CO (ET SUMNER)	1	26	41	117	186	158	138	58	0	0	0	0	0
ROOSEVELT CO (PORTALES)	2	50	81	223	329	277	230	100	1	0	0	0	0
CHAVES CO	2	63	109	311	413	433	418	111	0	0	0	0	0
ROSWELL	0	13	22	61	88	79	70	27	0	0	0	0	0
HAGERMAN	0	31	58	170	205	259	271	51	0	0	0	0	0
DEXTER	1	18	29	79	119	94	76	32	0	0	0	0	0
EDDY CO	5	121	207	615	866	924	931	312	3	0	0	0	0
CARLSBAD	1	20	33	94	140	126	112	50	0	0	0	0	0
ARTESIA	4	100	173	521	725	798	818	262	2	0	0	0	0
SANTA FE CO (SANTA FE)	236	3438	5143	12621	19276	8590	3437	1268	14	0	0	0	0
BERNALILLO CO (ALBUQUERQUE)	32	452	660	1600	2449	884	208	35	0	0	0	0	0
LEA CO	75	1550	2514	7047	10554	9356	7620	4522	56	0	0	0	0
TATUM	2	60	108	339	459	563	620	166	1	0	0	0	0
LOVINGTON	9	195	316	882	1327	1159	921	571	7	0	0	0	0
HOBBS	63	1294	2089	5825	8767	7643	6078	3784	48	0	0	0	0
UNION CO (CLAYTON)	0	9	22	94	116	231	310	58	0	0	0	0	0
HARDING CO	1	35	57	184	517	646	1251	2163	47	0	0	0	0
TOTALS	1291	24390	39201	115654	176469	160880	159047	90152	1281	0	0	0	0

APPENDIX G

Table G-1. BASE PAYROLL EXPENDITURES PER COMMUNITY (THOUSANDS OF FY 1980 $) Proposed Action

COUNTY & COMMUNITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CLARK CO., NEV. (LAS VEGAS)	26219	56906	59534	80128	85990	90609	71158	71000	56988	53485	53485	53485	53485
WASHOE CO., NEV (RENO)	0	0	0	0	0	0	0	0	0	0	0	0	0
SALT LAKE CO., UT (SALT LAKE CITY)	0	0	152	1612	1928	2315	2150	1906	1906	1906	1906	1906	1906
BEAVER CO., UT (MILFORD)	0	0	1680	17741	21209	25475	23651	20966	20966	20966	20966	20966	20966
IRON CO., UT	0	0	1069	11289	13496	16211	15050	13342	13342	13342	13342	13342	13342
BERYL	0	0	0	0	0	0	0	0	0	0	0	0	0
CEDAR CITY	0	0	1069	11289	13496	16211	15050	13342	13342	13342	13342	13342	13342
LINCOLN CO., NEV (CALIENTE&VICINITY)	1379	2995	3125	4132	4424	4647	3632	3636	2899	2714	2714	2714	2714
WHITE PINE CO., NEV (ELY&VICINITY)	0	0	0	0	0	0	0	0	0	0	0	0	0
WASHINGTON CO., UT (ST. GEORGE)	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	27598	59901	65560	114902	127047	139257	115641	110850	96101	92413	92413	92413	92413

ALTERNATIVE 1

Table G-2. BASE PAYROLL EXPENDITURES PER COMMUNITY

(THOUSANDS OF FY 1980 $)

COUNTY & COMMUNITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CLARK CO., NEV. (LAS VEGAS)	26219	56906	59534	80128	85990	90609	71158	71000	56988	53485	53485	53485	53485
WASHOE CO., NEV (RENO)	0	0	0	0	0	0	0	0	0	0	0	0	0
SALT LAKE CO., UT (SALT LAKE CITY)	0	0	152	1612	1928	2315	2150	1906	1906	1906	1906	1906	1906
BEAVER CO., UT (MILFORD)	0	0	305	3225	3856	4631	4300	3812	3812	3812	3812	3812	3812
IRON CO., UT	0	0	1832	19353	23136	27790	25800	22872	22872	22872	22872	22872	22872
BERYL	0	0	763	8064	9640	11579	10750	9530	9530	9530	9530	9530	9530
CEDAR CITY	0	0	1069	11289	13496	16211	15050	13342	13342	13342	13342	13342	13342
LINCOLN CO., NEV (CALIENTE&VICINITY)	1379	2995	3430	7358	8280	9278	7932	7448	6711	6526	6526	6526	6526
WHITE PINE CO., NEV (ELY&VICINITY)	0	0	0	0	0	0	0	0	0	0	0	0	0
WASHINGTON CO., UT (ST. GEORGE)	0	0	305	3225	3856	4631	4300	3812	3812	3812	3812	3812	3812
TOTALS	27598	59901	65558	114901	127046	139254	115640	110850	96101	92413	92413	92413	92413

ALTERNATIVE 2

Table G-3. BASE PAYROLL EXPENDITURES PER COMMUNITY

(THOUSANDS OF FY 1980 $)

COUNTY & COMMUNITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CLARK CO ,NEV. (LAS VEGAS)	26219	56906	59381	78515	84062	88293	69008	69094	55082	51579	51579	51579	51579
LINCOLN CO., NV (CALIENTE & VIC)	1379	2995	3125	4132	4424	4647	3632	3636	2899	2714	2714	2714	2714
MILLARD CO., UT (DELTA & VIC)	0	0	2444	25805	30850	37054	34401	30497	30497	30497	30497	30497	30497
JUAB CO., UT (EUREKA & NEPHI)	0	0	61	645	771	926	860	762	762	762	762	762	762
SALT LAKE/UTAH, UT	0	0	550	5806	6941	8337	7740	6861	6861	6861	6861	6861	6861
TOTALS	27598	59901	65561	114903	127048	139257	115641	110850	96101	92413	92413	92413	92413

ALTERNATIVE 3

Table G-4. BASE PAYROLL EXPENDITURES PER COMMUNITY

(THOUSANDS OF FY 1980 $)

COUNTY & COMMUNITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CLARK CO., NEV. (LAS VEGAS)	1221	2654	2954	5576	6426	7059	5890	5582	4845	4610	4610	4610	4610
WASHOE CO., NEV (RENO)	0	0	0	0	0	0	0	0	0	0	0	0	0
SALT LAKE CO., UT (SALT LAKE CITY)	1221	2654	2954	5576	6426	7059	5890	5582	4845	4610	4610	4610	4610
BEAVER CO., UT (MILFORD)	2443	5309	5562	7509	8509	9030	7234	7242	5768	5299	5299	5299	5299
IRON CO., UT	14659	31855	33375	45055	51055	54180	43405	43455	34611	31797	31797	31797	31797
BERYL	6108	13273	13906	18773	21273	22575	18085	18106	14421	13249	13249	13249	13249
CEDAR CITY	8551	18582	19469	26282	29782	31605	25320	25349	20190	18548	18548	18548	18548
LINCOLN CO., NEV (CALIENTE&VICINITY)	2443	5309	5562	7509	8509	9030	7234	7242	5768	5299	5299	5299	5299
WHITE PINE CO., NEV (ELY&VICINITY)	0	0	3108	32794	39088	45808	40924	35300	35300	35300	35300	35300	35300
WASHINGTON CO., UT (ST GEORGE)	2443	5309	5562	7509	8509	9030	7234	7242	5768	5299	5299	5299	5299
TOTALS	24430	53090	59077	111528	128522	141196	117811	111645	96905	92214	92214	92214	92214

ALTERNATIVE 4

Table G-5. BASE PAYROLL EXPENDITURES PER COMMUNITY

(THOUSANDS OF FY 1980 $)

COUNTY & COMMUNITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CLARK CO., NEV. (LAS VEGAS)	1221	2654	6062	38371	45380	52734	46681	40748	40078	39911	39911	39911	39911
WASHOE CO., NEV (RENO)	0	0	0	0	0	0	0	0	0	0	0	0	0
SALT LAKE CO., UT (SALT LAKE CITY)	1221	2654	2781	3754	4120	4381	3483	3487	2817	2649	2649	2649	2649
BEAVER CO., UT (MILFORD)	2443	3309	5562	7509	8241	8762	6966	6974	5634	5299	5299	5299	5299
IRON CO., UT	14659	31855	33375	45055	49447	52572	41797	41847	33807	31797	31797	31797	31797
BERYL	6108	13273	13906	18773	20603	21905	17415	17436	14086	13249	13249	13249	13249
CEDAR CITY	8551	18582	19469	26282	28844	30667	24382	24411	19721	18548	18548	18548	18548
LINCOLN CO., NEV (CALIENTE&VICINITY)	2443	5309	5735	9331	10412	11307	9239	8935	7595	7260	7260	7260	7260
WHITE PINE CO., NEV (ELY&VICINITY)	0	0	0	0	0	0	0	0	0	0	0	0	0
WASHINGTON CO., UT (ST GEORGE)	2443	5309	5562	7509	8241	8762	6966	6974	5634	5299	5299	5299	5299
TOTALS	24430	53090	59077	111529	125841	138518	115132	108965	95565	92215	92215	92215	92215

ALTERNATIVE 5

Table G-6. BASE PAYROLL EXPENDITURES PER COMMUNITY

(THOUSANDS OF FY 1980 $)

COUNTY & COMMUNITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CLARK CO ,NEV (LAS VEGAS)	1221	2654	2954	5576	6426	7059	5890	5582	4845	4610	4610	4610	4610
WASHOE CO ,NEV (RENO)	0	0	0	0	0	0	0	0	0	0	0	0	0
SALT LAKE CO ,UT (SALT LAKE CITY)	1221	2654	2954	5576	6426	7059	5890	5582	4845	4610	4610	4610	4610
BEAVER CO ,UT (MILFORD)	13437	29200	30594	41301	46800	49665	39788	39834	31727	29147	29147	29147	29147
IRON CO ,UT	8551	18582	19469	26282	29782	31605	25320	25349	20190	18548	18548	18548	18548
BERYL	0	0	0	0	0	0	0	0	0	0	0	0	0
CEDAR CITY	8551	18582	19469	26282	29782	31605	25320	25349	20190	18548	18548	18548	18548
LINCOLN CO ,NEV (CALIENTE&VICINITY)	0	0	0	0	0	0	0	0	0	0	0	0	0
WHITE PINE CO ,NEV (ELY&VICINITY)	0	0	3108	32794	39088	45808	40924	35300	35300	35300	35300	35300	35300
WASHINGTON CO ,UT (ST. GEORGE)	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	24430	53090	59079	111529	128522	141196	117812	111647	96907	92215	92215	92215	92215

ALTERNATIVE 6

Table G-7. BASE PAYROLL EXPENDITURES PER COMMUNITY

(THOUSANDS OF FY 1980 $)

COUNTY & COMMUNITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CLARK CO., NEV. (LAS VEGAS)	1221	2654	6062	38371	45380	52734	46681	40748	40078	39911	39911	39911	39911
WASHOE CO., NEV (RENO)	0	0	0	0	0	0	0	0	0	0	0	0	0
SALT LAKE CO., UT (SALT LAKE CITY)	1221	2654	2781	3754	4120	4381	3483	3487	2817	2649	2649	2649	2649
BEAVER CO., UT (MILFORD)	13437	29200	30594	41301	45326	48191	38314	38360	30990	29147	29147	29147	29147
IRON CO., UT	8551	18582	19469	26282	28844	30667	24382	24411	19721	18548	18548	18548	18548
BERYL	0	0	0	0	0	0	0	0	0	0	0	0	0
CEDAR CITY	8551	18582	19469	26282	28844	30667	24382	24411	19721	18548	18548	18548	18548
LINCOLN CO., NEV (CALIENTE&VICINITY)	0	0	172	1821	2171	2544	2273	1961	1961	1961	1961	1961	1961
WHITE PINE CO., NEV (ELY&VICINITY)	0	0	0	0	0	0	0	0	0	0	0	0	0
WASHINGTON CO., UT (ST GEORGE)	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	24430	53090	59078	111529	125841	138517	115133	108967	95567	92216	92216	92216	92216

Table G-8. BASE PAYROLL EXPENDITURES PER COMMUNITY

ALTERNATIVE 7

(THOUSANDS OF FY 1980 $)

COUNTY & COMMUNITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
POTTER/RANDALL COS. (AMARILLO TX.)	1004	2063	2644	6611	7600	8586	7408	6852	6231	6075	6075	6075	6075
MOORE CO., TX (DUMAS)	0	0	329	3474	4148	4924	4482	3922	3922	3922	3922	3922	3922
DALLAM CO., TX (DALHART)	0	0	823	8685	10370	12311	11205	9805	9805	9805	9805	9805	9805
HARTLEY CO., TX	0	0	1810	19108	22815	27084	24652	21572	21572	21572	21572	21572	21572
DALHART	0	0	1646	17371	20741	24622	22411	19611	19611	19611	19611	19611	19611
HARTLEY	0	0	164	1737	2074	2462	2241	1961	1961	1961	1961	1961	1961
LUBBOCK CO., TX (LUBBOCK)	1507	3095	3473	4706	5178	5493	4389	4394	3463	3230	3230	3230	3230
CURRY CO., NM (CLOVIS)	16329	33530	37624	50983	56101	59510	47550	47608	37517	34994	34994	34994	34994
ROOSEVELT CO., NM (PORTALES)	6280	12896	14471	19608	21577	22888	18288	18310	14429	13459	13459	13459	13459
CHAVES CO., NM (ROSWELL)	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	25120	51584	61174	113175	127789	140796	117974	112463	96939	93057	93057	93057	93057

Table G-9. BASE PAYROLL EXPENDITURES PER COMMUNITY

(THOUSANDS OF FY 1980 $)

COUNTY & COMMUNITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CLARK CO., NEV (LAS VEGAS)	26219	56906	59381	78515	86071	87290	68004	68004	58167	55673	55673	55673	55673
LINCOLN CO., NV (CALIENTE & VIC)	1379	2995	3125	4132	4530	4594	3579	3579	3061	2930	2930	2930	2930
MILLARD CO., UT (DELTA & VIC)	0	0	0	0	0	0	0	0	0	0	0	0	0
JUAB CO., UT (EUREKA & NEPHI)	0	0	0	0	0	0	0	0	0	0	0	0	0
SALT LAKE/UTAH, UT	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	27598	59901	62506	82647	90601	91884	71583	71583	61228	58603	58603	58603	58603

Table G-10. BASE PAYROLL EXPENDITURES PER COMMODITY

(THOUSANDS OF FY 1980 $)

COUNTY & COMMODITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
POTTER/RANDALL COS (AMARILLO TX)	1004	2190	2315	3137	3533	3608	2872	2872	2436	2325	2325	2325	2325
HOUSE CO , TX (QUITAQUE)	0	0	0	0	0	0	0	0	0	0	0	0	0
DALLAM CO , TX (DALHART)	0	0	0	0	0	0	0	0	0	0	0	0	0
HARTLEY CO , TX	0	0	0	0	0	0	0	0	0	0	0	0	0
DALHART	0	0	0	0	0	0	0	0	0	0	0	0	0
HARTLEY	0	0	0	0	0	0	0	0	0	0	0	0	0
LUBBOCK CO , TX (LUBBOCK)	1507	3285	3473	4706	5299	5412	4308	4308	3651	3488	3488	3488	3488
CURRY CO , NM (CLOVIS)	16329	35588	37624	50983	57413	58635	46675	46675	39591	37795	37795	37795	37795
ROOSEVELT CO , NM (PORTALES)	6280	13687	14471	19608	22082	22552	17952	17952	15227	14536	14536	14536	14536
CHAVES CO , NM (ROSWELL)	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	25120	54750	57883	78434	88327	90207	71807	71807	60900	58144	58144	58144	58144

APPENDIX H

Table H-1. OPERATIONS PROCUREMENT PER COMMUNITY (THOUSANDS OF FY 1980 $) Proposed Action

COUNTY & COMMUNITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CLARK CO., NEV (LAS VEGAS)	0	94	564	6313	13813	19567	20798	21349	21349	21349	21349	21349	21349
WASHOE CO., NEV (RENO)	0	0	0	0	0	0	0	0	0	0	0	0	0
SALT LAKE CO., UT (SALT LAKE CITY)	0	0	0	22	177	1408	3254	4052	4052	4052	4052	4052	4052
BEAVER CO., UT (MILFORD)	0	0	0	22	177	1408	3254	4052	4052	4052	4052	4052	4052
IRON CO., UT (BERYL/CEDAR CITY)	0	0	0	14	118	938	2169	2701	2701	2701	2701	2701	2701
LINCOLN CO., NEV (CALIENTE&VICINITY)	0	0	0	0	0	0	0	0	0	0	0	0	0
WHITE PINE CO., NEV (ELY&VICINITY)	0	0	0	0	0	0	0	0	0	0	0	0	0
WASHINGTON CO., UT (ST. GEORGE)	0	9	56	636	1428	2331	2946	3214	3214	3214	3214	3214	3214
TOTALS	0	103	620	7007	15713	25652	32421	35368	35368	35368	35368	35368	35368

Table H-2. OPERATIONS PROCUREMENT PER COMMUNITY

ALTERNATIVE 1

(THOUSANDS OF FY 1980 $)

COUNTY & COMMUNITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CLARK CO ,NEV (LAS VEGAS)	0	94	564	6321	13872	20037	21883	22700	22700	22700	22700	22700	22700
WASHOE CO ,NEV (RENO)	0	0	0	0	0	0	0	0	0	0	0	0	0
SALT LAKE CO ,UT (SALT LAKE CITY)	0	0	0	14	118	938	2169	2701	2701	2701	2701	2701	2701
BEAVER CO ,UT (MILFORD)	0	0	0	7	59	469	1084	1350	1350	1350	1350	1350	1350
IRON CO ,UT (BERYL/CEDAR CITY)	0	0	0	22	177	1408	3254	4052	4052	4052	4052	4052	4052
LINCOLN CO ,NEV (CALIENTE&VICINITY)	0	0	0	0	0	0	0	0	0	0	0	0	0
WHITE PINE CO ,NEV (ELY&VICINITY)	0	0	0	0	0	0	0	0	0	0	0	0	0
WASHINGTON CO ,UT (ST GEORGE)	0	9	56	643	1487	2800	4031	4565	4565	4565	4565	4565	4565
TOTALS	0	103	620	7007	15713	25652	32421	35368	35368	35368	35368	35368	35368

Table H-3. OPERATIONS PROCUREMENT PER COMMUNITY

(THOUSANDS OF FY 1980 $)

COUNTY & COMMUNITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CLARK CO , NEV (LAS VEGAS)	0	94	564	6299	13695	18629	18629	18648	18648	18648	18648	18648	18648
LINCOLN CO , NV (CALIENTE & VIC)	0	0	0	0	0	0	0	0	0	0	0	0	0
MILLARD CO , UT (DELTA & VIC)	0	0	0	29	237	1877	4339	5403	5403	5403	5403	5403	5403
JUAB CO , UT (EUREKA & NEPHI)	0	0	0	7	59	469	1084	1350	1350	1350	1350	1350	1350
SALT LAKE/UTAH, UT	0	0	0	37	296	2347	5424	6754	6754	6754	6754	6754	6754
WASHINGTON CO , UT (ST GEORGE)	0	9	56	629	1369	1862	1862	1864	1864	1864	1864	1864	1864
IRON CO , UT (BERYL)	0	0	0	7	59	469	1084	1350	1350	1350	1350	1350	1350
TOTALS	0	103	620	7008	15715	25653	32422	35369	35369	35369	35369	35369	35369

ALTERNATIVE 3

Table H-4. OPERATIONS PROCUREMENT PER COMMUNITY

(THOUSANDS OF FY 1980 $)

COUNTY & COMMUNITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CLARK CO., NEV. (LAS VEGAS)	0	28	169	1903	4226	6526	7757	8295	8295	8295	8295	8295	8295
WASHOE CO., NEV (RENO)	0	0	0	7	59	469	1084	1350	1350	1350	1350	1350	1350
SALT LAKE CO., UT (SALT LAKE CITY)	0	18	112	1273	2857	4663	5894	6430	6430	6430	6430	6430	6430
BEAVER CO., UT (MILFORD)	0	9	56	629	1369	1862	1862	1864	1864	1864	1864	1864	1864
IRON CO., UT (BERYL/CEDAR CITY)	0	28	169	1889	4108	5588	5588	5594	5594	5594	5594	5594	5594
LINCOLN CO., NEV (CALIENTE&VICINITY)	0	0	0	0	0	0	0	0	0	0	0	0	0
WHITE PINE CO., NEV (ELY&VICINITY)	0	0	0	44	355	2816	6509	8105	8105	8105	8105	8105	8105
WASHINGTON CO., UT (ST. GEORGE)	0	18	112	1259	2739	3725	3725	3729	3729	3729	3729	3729	3729
TOTALS	0	101	618	7004	15713	25649	32419	35367	35367	35367	35367	35367	35367

ALTERNATIVE 4

Table H-5. OPERATIONS PROCUREMENT PER COMMUNITY

(THOUSANDS OF FY 1980 $)

COUNTY & COMMUNITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CLARK CO., NEV. (LAS VEGAS)	0	28	169	1963	4701	10282	16437	19103	19103	19103	19103	19103	19103
WASHOE CO., NEV (RENO)	0	0	0	0	0	0	0	0	0	0	0	0	0
SALT LAKE CO., UT (SALT LAKE CITY)	0	18	112	1259	2739	3725	3725	3729	3729	3729	3729	3729	3729
BEAVER CO., UT (MILFORD)	0	9	56	629	1369	1862	1862	1864	1864	1864	1864	1864	1864
IRON CO., UT (BERYL/CEDAR CITY)	0	28	169	1889	4108	5588	5588	5594	5594	5594	5594	5594	5594
LINCOLN CO., NEV (CALIENTE&VICINITY)	0	0	0	0	0	0	0	0	0	0	0	0	0
WHITE PINE CO., NEV (ELY&VICINITY)	0	0	0	0	0	0	0	0	0	0	0	0	0
WASHINGTON CO., UT (ST. GEORGE)	0	18	112	1266	2798	4194	4809	5079	5079	5079	5079	5079	5079
TOTALS	0	101	618	7006	15715	25651	32421	35369	35369	35369	35369	35369	35369

ALTERNATIVE 5

Table H-6. OPERATIONS PROCUREMENT PER COMMUNITY

(THOUSANDS OF FY 1980 $)

COUNTY & COMMUNITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CLARK CO., NEV (LAS VEGAS)	0	18	112	1273	2857	4663	5894	6430	6430	6430	6430	6430	6430
WASHOE CO., NEV (RENO)	0	0	0	7	59	469	1084	1350	1350	1350	1350	1350	1350
SALT LAKE CO., UT (SALT LAKE CITY)	0	28	169	1903	4226	6526	7757	8295	8295	8295	8295	8295	8295
BEAVER CO., UT (MILFORD)	0	28	169	1889	4108	5588	5588	5594	5594	5594	5594	5594	5594
IRON CO., UT (BERYL/CEDAR CITY)	0	18	112	1259	2739	3725	3725	3729	3729	3729	3729	3729	3729
LINCOLN CO., NEV (CALIENTE&VICINITY)	0	0	0	0	0	0	0	0	0	0	0	0	0
WHITE PINE CO., NEV (ELY&VICINITY)	0	0	0	44	355	2816	6509	8105	8105	8105	8105	8105	8105
WASHINGTON CO., UT (ST. GEORGE)	0	9	56	629	1369	1862	1862	1864	1864	1864	1864	1864	1864
TOTALS	0	101	618	7004	15713	25649	32419	35367	35367	35367	35367	35367	35367

ALTERNATIVE 6

Table H-7. OPERATIONS PROCUREMENT PER COMMUNITY

(THOUSANDS OF FY 1980 $)

COUNTY & COMMUNITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CLARK CO.,NEV (LAS VEGAS)	0	18	112	1333	3332	8419	14574	17238	17238	17238	17238	17238	17238
WASHOE CO.,NEV (RENO)	0	0	0	0	0	0	0	0	0	0	0	0	0
SALT LAKE CO.,UT (SALT LAKE CITY)	0	28	169	1889	4108	5588	5588	5594	5594	5594	5594	5594	5594
BEAVER CO.,UT (MILFORD)	0	28	169	1889	4108	5588	5588	5594	5594	5594	5594	5594	5594
IRON CO.,UT (BERYL/CEDAR CITY)	0	18	112	1259	2739	3725	3725	3729	3729	3729	3729	3729	3729
LINCOLN CO.,NEV (CALIENTE&VICINITY)	0	0	0	0	0	0	0	0	0	0	0	0	0
WHITE PINE CO.,NEV (ELY&VICINITY)	0	0	0	0	0	0	0	0	0	0	0	0	0
WASHINGTON CO.,UT (ST. GEORGE)	0	9	56	636	1428	2331	2946	3214	3214	3214	3214	3214	3214
TOTALS	0	101	618	7006	15715	25651	32421	35369	35369	35369	35369	35369	35369

Table H-8. OPERATIONS PROCUREMENT PER COMMUNITY — ALTERNATIVE 7

(THOUSANDS OF FY 1980 $)

COUNTY & COMMUNITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
POTTER/RANDALL COS. (AMARILLO TX.)	0	20	124	1414	3250	5975	8437	9505	9505	9505	9505	9505	9505
MOORE CO., TX (DUMAS)	0	0	0	5	47	375	867	1080	1080	1080	1080	1080	1080
DALLAM CO., TX (DALHART)	0	0	0	19	154	1220	2820	3512	3512	3512	3512	3512	3512
HARTLEY CO., TX (HARTLEY/DALHART)	0	0	0	19	154	1220	2820	3512	3512	3512	3512	3512	3512
LUBBOCK CO., TX (LUBBOCK)	0	20	124	1392	3072	4567	5182	5452	5452	5452	5452	5452	5452
CURRY CO., NM (CLOVIS)	0	47	282	3149	6847	9314	9314	9324	9324	9324	9324	9324	9324
ROOSEVELT CO., NM (PORTALES)	0	9	56	629	1369	1862	1862	1864	1864	1864	1864	1864	1864
CHAVES CO., NM (ROSWELL)	0	5	33	377	821	1117	1117	1118	1118	1118	1118	1118	1118
TOTALS	0	101	619	7004	15714	25650	32419	35367	35367	35367	35367	35367	35367

ALTERNATIVE 8A

Table H-9. OPERATIONS PROCUREMENT PER COMMUNITY

(THOUSANDS OF FY 1980 $)

COUNTY & COMMUNITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CLARK CO., NEV. (LAS VEGAS)	0	94	564	6299	15070	20154	20154	20154	20154	20154	20154	20154	20154
LINCOLN CO., NV (CALIENTE & VIC)	0	0	0	0	0	0	0	0	0	0	0	0	0
MILLARD CO., UT (DELTA & VIC)	0	0	0	0	0	0	0	0	0	0	0	0	0
JUAB CO., UT (EUREKA & NEPHI)	0	0	0	0	0	0	0	0	0	0	0	0	0
SALT LAKE/UTAH, UT	0	0	0	0	0	0	0	0	0	0	0	0	0
WASHINGTON CO., UT (ST GEORGE)	0	9	56	629	1507	2015	2015	2015	2015	2015	2015	2015	2015
IRON CO., UT (BERYL)	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	103	620	6928	16577	22169	22169	22169	22169	22169	22169	22169	22169

Table H-10. OPERATIONS PROCUREMENT PER COMMUNITY

(THOUSANDS OF FY 1980 $)

COUNTY & COMMUNITY	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
POTTER/RANDALL COS (AMARILLO TX)	0	20	124	1385	3315	4433	4433	4433	4433	4433	4433	4433	4433
MOORE CO ,TX (DUMAS)	0	0	0	0	0	0	0	0	0	0	0	0	0
DALLAM CO ,TX (DALHART)	0	0	0	0	0	0	0	0	0	0	0	0	0
HARTLEY CO ,TX (HARTLEY/DALHART)	0	0	0	0	0	0	0	0	0	0	0	0	0
LUBBOCK CO ,TX (LUBBOCK)	0	20	124	1385	3315	4433	4433	4433	4433	4433	4433	4433	4433
CURRY CO ,NM (CLOVIS)	0	47	282	3149	7535	10077	10077	10077	10077	10077	10077	10077	10077
ROOSEVELT CO ,NM (PORTALES)	0	9	56	629	1507	2015	2015	2015	2015	2015	2015	2015	2015
CHAVES CO ,NM (ROSWELL)	0	5	33	377	904	1209	1209	1209	1209	1209	1209	1209	1209
TOTALS	0	101	619	6925	16576	22167	22167	22167	22167	22167	22167	22167	22167

APPENDIX I

IMPACT ANALYSIS FOR LANDER, ESMERALDA, AND TOOELE COUNTIES

This appendix presents an assessment of output, earnings, and employment impacts in three counties adjacent to the formally defined Nevada/Utah ROI-Lander, Esmeralda, and Tooele counties.

LANDER COUNTY

In 1988, in Lander County, Nevada, camp payroll expenditures reach a peak of $1,146,000 under the Proposed Action and Alternatives 1, 2, 4, and 6. For Alternatives 3 and 5, peak expenditures again occur in 1988 in Lander County, and reach a maximum of $1,257,000. For split deployment in Nevada/Utah (Alternative 8), peak expenditures in this county occur in 1986, reaching a level of $119,000. Long-term expenditures in the county are projected to be zero under all alternatives.

These expenditures can be evaluated using personal consumption expenditure multipliers for Lander County estimated with the Regional Industrial Multiplier System (RIMS). Using for the Lander County economy the assumptions regarding structural change which have been applied to the other rural Nevada/Utah ROI counties, a personal consumption expenditure (PCE) multiplier of 1.703 has been estimated with RIMS. Consistent with assumptions made for the other Nevada/Utah ROI counties, this figure has been increased to 1.800 in order to account for additional potential changes in the Lander County economy as a result of M-X (see Section 3). Personal consumption expenditures are used in this analysis to estimate indirect output, earnings, and employment changes associated with M-X deployment. No direct employment is projected for Lander County, because all DDA construction camps would be located outside the county. Indirect gross output change as a result of M-X deployment is estimated as the change in personal consumption expenditure final demand times the PCE multiplier of 1.800 for Lander County. The change in gross output would be $2,062,800 in the peak year of 1988 for the Proposed Action, as Table I-1 indicates. This change in indirect gross output would be associated with a change in indirect earnings of $703,800. Using the Nevada/Utah regional average earnings per worker estimates applied elsewhere in the economic impact analysis, this change in earnings would be associated with indirect employment of about 50 jobs. The indirect employment change associated with M-X represents 2.5 percent of total wage and salary and proprietary employment of 1,936 jobs in Lander County in 1979.

Peak DDA camp personal consumption expenditures in Lander County under Alternatives 3 and 5 are projected to be $1,257,000 in 1988. These outlays can be evaluated using the same procedures applied above to estimate the impacts of the Proposed Action and Alternatives 1, 2, 4, and 6. The peak-year change in indirect gross output would be $2,262,600, implying a change in indirect earnings of $772,000 and indirect employment of just over 50 jobs (see Table I-1). These impacts are slightly greater than for the Proposed Action and Alternatives 1, 2, 4, and 6.

Peak impacts would be much smaller under split deployment (Alternative 8). The projected final demand change is $119,000, implying changes in indirect gross output, earnings, and employment of $214,200, $73,100, and 5 jobs, respectively (see Table I-1).

ESMERALDA COUNTY

Esmeralda and Tooele counties were not included in the gravity model calculations in the M-X socioeconomic impact modeling system, so no estimates of personal consumption expenditures have been derived for these counties. It is possible, however, to obtain projections of camp payroll expenditures in each of these counties using 1980 Census of Population counts to approximate such an allocation. This analysis assumes that peak-year expenditures going into Esmeralda County would be proportional to peak-year employment in construction camps closest to Esmeralda County (camps 12 and 13) in Nye County, Nevada. In the peak year, camps 12 and 13 would account for 40.1 percent of DDA construction and assembly and checkout employment in Nye County under the Proposed Action and Alternatives 1, 2, 3, 4, and 6; and 34.0 percent under Alternative 3 and 5. For Alternative 8, the percentage derived for the Proposed Action is used. The combined 1980 population of Esmeralda and Nye counties is 9,893 persons. Of this total, 773 persons lived in Esmeralda County, 7.8 percent of the 2-county total, and 9,120 persons lived in Nye County. Using this proportionate distribution of population between the two counties, 7.8 percent of camp payroll expenditures attributable to camps 12 and 13 in Nye County (40.1 percent or 34.0 percent, depending on the Alternative) are assumed to be spent in Esmeralda County.

For the Proposed Action and Alternatives 1, 2, 4, and 6, peak camp payroll consumption expenditures in Nye County are projected at $127,426,000 in 1987. For alternatives 3 and 5, peak consumption expenditures in Nye County would be $103,567,000 in 1987. Nye County would be almost unaffected by Nevada/Utah split deployment, with peak camp payroll expenditures of only $42,000 in 1988 in Nye County under Alternative 8 (Nevada/Utah split deployment). Assuming Esmeralda County's share of peak consumption expenditures to be 7.8 percent of the proportion of expenditures attributed to camps in Nye County which are closest to Esmeralda County (camps 12 and 13), Esmeralda County expenditures would be $3,989,000 for the Proposed Action and Alternatives 1, 2, 4, and 6, $2,746,600 for Alternatives 3 and 5, and $1,300 for Alternative 8 (split deployment) in Esmeralda County. Peak years would be the same as those in Nye County. At peak, indirect M-X employment in Esmeralda County would be about 170 jobs, 60 percent of the county's 1979 total employment.

TOOELE COUNTY

Potential expenditures in Tooele County can be estimated using expenditures projected in the gravity model for Salt Lake and Utah counties, assuming that a fraction of these expenditures would, in fact, be made in Tooele County. Expenditures in Salt Lake and Utah counties originate from a large number of camps, and effects from specific construction camps cannot be singled out. However, an allocation can be made based on population levels in Tooele, Salt Lake, and Utah counties. The 1980 population of Tooele County was 26,012, while Salt Lake County had a 1980 population of 617,966 persons and Utah County, 217,281 in that year. Tooele County had a 3.0 percent share of the combined 3-county population of

861,259 persons in 1980. This share of 3.0 percent for Tooele County can be applied to projected peak year camp payroll expenditures in Salt Lake/Utah counties to derive estimates of expenditures in Tooele County.

Expenditures in Salt Lake/Utah counties are projected to peak at $79,799,000 in 1987 (FY 1980 dollars), for the Proposed Action and Alternatives 1, 2, 4, and 6. Under Alternatives 3 and 5, peak camp payroll expenditures in Salt Lake/Utah counties would be $84,804,000 in 1986. Under split deployment, peak camp payroll expenditures in Salt Lake/Utah counties would occur in 1986, reaching a level of $46,624,000. Expenditures in Tooele County can be calculated as 3.0 percent of each of these peak-year figures, or $2,394,000 for the Proposed Action and Alternatives 1, 2, 4, and 6; $2,544,100 for Alternatives 3 and 5; and $1,398,700 for Alternative 8. Peak years would, of course, be the same as for Salt Lake/Utah counties.

Indirect gross output, employment, and earnings changes in Esmeralda and Tooele counties have been calculated from these data using the modified RIMS multipliers for personal consumption expenditures (these multipliers would be 1.8 or larger) using the same approach as that employed for Lander County. Table I-1 summarizes projections of indirect gross output, earnings, and employment for Esmeralda and Tooele counties. It also presents projected employment as a percentage of 1979 employment in the counties. In Tooele County, peak employment would be 115 jobs, but would represent only one percent of 1979 employment in the county.

Table I-1. Peak year indirect gross output, earnings, and employment estimates for Lander, Esmeralda, and Tooele counties

	Personal Consumption Final Demand Change (peak year)	Change in Gross Output[1]	Change in Earnings[2]	Indirect Jobs[3]	Percent of 1979 Employment
	Thousands of FY 1980 dollars			Number	Percent
Lander County					
PA, Alts. 1,2,4,6	1,146.0 (1986)	2,062.8	703.8	49	2.5
Alts. 3 & 5	1,257.0 (1988)	2,262.6	772.0	53	2.7
Alt. 8	119.0 (1986)	214.2	73.1	5	0.3
Esmeralda County					
PA, Alts.1,2,4,6	3,988.6 (1986)	7,179.5	2,449.6	169	60.2
Alts. 3 & 5	2,746.6 (1988)	4,943.9	1,686.8	116	41.4
Alt. 8	1.3 (1986)	2.3	0.8	--	--
Tooele County					
PA, Alts, 1,2,4,6	2,394.0 (1987)	4,584.5	1,564.2	108	1.3
Alts. 3 & 5	2,544.1 (1986)	4,872.0	1,662.3	115	1.4
Alt. 8	1,398.7 (1986)	2,678.5	913.9	63	0.8

T5895/9-28-81

[1]Personal consumption expenditure multiplier (Esmeralda and Lander counties, 1.800; Tooele County, 1.915) times final demand change.

[2]Earnings-gross output ratio of 0.3412 times change in gross output.

[3]Assumed Nevada/Utah average earnings per worker of $14,497.

Sources: HDR Sciences, Regional Industrial Multiplier System, and data from U.S. Air Force, U.S. Bureau of Economic Analysis, U.S. Bureau of the Census, and other federal and state agencies.

END

FILMED

3-85

DTIC